DOCUMENT RESUME

ED 462 396 TM 024 974

AUTHOR	Grandy, Jerilee
TITLE	Persistence in Science of High-Ability Minority Students, Phase V: Comprehensive Data Analysis. Research Report.
INSTITUTION	Educational Testing Service, Princeton, NJ.
SPONS AGENCY	National Science Foundation, Washington, DC.
REPORT NO	ETS-RR-95-31
PUB DATE	1995-10-00
NOTE	136p.
CONTRACT	9255374
PUB TYPE	Reports - Evaluative (142)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Ability; Academic Aspiration; *Academic Persistence; Academically Gifted; Causal Models; College Students; *Course Selection (Students); Data Analysis; *Engineering; Ethnicity; Followup Studies; High School Students; High Schools; Higher Education; Longitudinal Studies; Majors (Students); *Mathematics Education; *Minority Groups; Occupational Aspiration; Prediction; *Science Education; Social Support Groups; Student Attitudes; Telephone Surveys
IDENTIFIERS	*LISREL Computer Program; *Scholastic Aptitude Test

ABSTRACT

A longitudinal study was designed in 1986 to investigate why some high-ability minority students follow through with their plans to enroll in college and major in mathematics, science, or engineering (MSE) fields, while others do not. Data came from three sources: (1) 1985 Scholastic Aptitude Test (SAT) files of a sample of minority students planning to major in MSE fields and scoring above 550 on the SAT mathematics test; (2) a detailed survey questionnaire completed in 1987; and (3) a status survey in 1990. This report of Phase 5 describes the results of causal modeling using The LISREL Computer Program to determine the direct and indirect effects of gender, socioeconomic status, high school variables, and college variables on student status 5 years after high school. Most important to persistence in science and engineering were the type of college attended (2-year or 4-year), minority support systems early in college, and commitment to science or engineering by the sophomore year. The roles of other variables are discussed, and the report concludes with practical recommendations for counseling and intervention. Appendix A is a table of variable and outcome correlations. Appendix B is a correlation matrix of measured variables. Appendices C, D, and E contain LISREL computer data for best fitting model and for each gender. (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

RR-95-31

ED 462 396

RESEARCH REPORT

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
E. Mingo
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
1

PERSISTENCE IN SCIENCE OF HIGH-ABILITY MINORITY STUDENTS, PHASE V: COMPREHENSIVE DATA ANALYSIS

Jerilee Grandy

Educational Testing Service
Princeton, New Jersey
October 1995

TM024974

BEST COPY AVAILABLE

PERSISTENCE IN SCIENCE OF HIGH-ABILITY MINORITY STUDENTS, PHASE V:

COMPREHENSIVE DATA ANALYSIS

The final report of a project supported by the National Science Foundation,
Grant No. 9255374

Jerilee Grandy
Educational Testing Service

The opinions expressed in this report are those of the author and
do not necessarily reflect those of the National Science Foundation
or Educational Testing Service

ETS
Educational Testing Service
Princeton, New Jersey
May 1995

Copyright © 1995 by Educational Testing Service. All rights reserved.

Acknowledgements

I am indebted to my colleague, Thomas L. Hilton, who began this project in 1985 and collected the data which I have had the oppportunity to analyze. I am also grateful for his very thoughtful review of this report.

In addition, I thank Nancy Robertson for her work on the reorganization and documentation of the database for this special analysis.

My thanks also go to three additional reviewers: Donald Rock, William M. Boyd, and Willie Pearson, who provided valuable comments and suggestions.

Abstract

Concern over the underrepresentation of minorities in mathematics, science, and engineering led to this longitudinal study begun by Thomas Hilton in 1986 under a grant from the National Science Foundation. The purpose of the study was to investigate why some high-ability minority students follow through with their plans to become scientists or engineers, while others with the same plans do not.

Data came from three sources: (1) 1985 SAT files of a sample of minority students planning to major in math, science, and engineering and scoring above 550 on the SAT mathematics test, (2) a detailed survey questionnaire completed in 1987, and (3) a status survey in 1990.

Hilton reported results of the first four phases of the project, including multiple regression analyses. This report of Phase V describes the results of causal modeling using LISREL to determine the direct and indirect effects of gender, SES, high school variables, and college variables on student status five years after high school.

Most important to persistence in science and engineering were the type of college attended (2-year or 4-year), minority support systems early in college, and commitment to science or engineering by the sophomore year. The role of other variables and their effects on commitment and persistence are discussed in technical detail. Important gender differences are also discussed. The report concludes with a list of practical recommendations for counselors and heads of intervention programs both at the high school and college levels.

CONTENTS

Page

BACKGROUND TO PHASE V 1

RATIONALE FOR PHASE V: COMPREHENSIVE DATA ANALYSIS 4

PROCEDURE 7

- Sample 7
- Variables 8
- Preparation of Data 11
- Building and Testing Models 12

ANALYSIS AND RESULTS 14

- Correlations among Measured Variables 14
- Best-Fitting Solution 15
- Discussion of Effects of Each Variable on Persistence 27
- A Remaining Question 33
- Comparison of Separate Models for Males and Females 33

POLICY IMPLICATIONS 38

RESEARCH IMPLICATIONS 40

RECOMMENDATIONS 44

- High School Level 44
- College Level 45

REFERENCES 47

APPENDIXES 49

- APPENDIX A: Correlation between Each Measured Variable and Outcome in 1990
- APPENDIX B: Complete Correlation Matrix of All Measured Variables
- APPENDIX C: LISREL Computer Output for Best-Fitting Model
- APPENDIX D: LISREL Solution for Male Sample
- APPENDIX E: LISREL Solution for Female Sample

BACKGROUND TO PHASE V

Concern over the underrepresentation of minorities in mathematics, science, and engineering (MSE) led to this longitudinal study of high-ability minority students under a grant from the National Science Foundation. The purpose of the study was to investigate why some high-ability minority students follow through with their plans to become scientists or engineers, while others with the same plans do not.

This study was begun and directed by Hilton in 1986. Two reports, completed prior to this one, are now available (Hilton, Hsia, Solorzano, & Burton, 1989; Hilton, Hsia, Cheng, & Miller, 1994). Hilton and his colleagues began by sampling high-ability students who took the Scholastic Aptitude Test (SAT) in 1985 and followed the progress of those students for five years. Students had to have scored at least 550 on the SAT mathematics test section (which places them among the top 29% of the SAT population), and they had to have indicated that they planned to major in MSE in college. MSE was defined to include agriculture, architecture, biological sciences, computer sciences, engineering, medical and dental professions, mathematics, and physical sciences. Social sciences and psychology were not included.[1] The initial sample contained all qualifying students from four underrepresented minority groups: 354 American Indian, 2,666 Black, 1,488 Mexican American, and 690 Puerto Rican students. To this group were added random samples of 688 Asian American and 404 White students satisfying the same selection criteria.

Information from the SAT files contained not only test scores, but data from the Student Descriptive Questionnaire (SDQ) completed by most students who register to take the SAT. Included among these data were self reported grades, self ratings of various abilities, family background, and high school activities.

---

[1] The decision regarding which disciplines to include in MSE was made in accordance with the consensus of the NSF Committee on Equal Opportunities in Science and Engineering (CEOSE).

In the spring and summer of 1987, two years after these students graduated from high-school, Hilton and colleagues sent a lengthy questionnaire, entitled the Postsecondary Experience Survey (PES), to all students in the sample and used extensive followup procedures to encourage the return of questionnaires. The PES asked about high school experiences, factors influencing career plans, current educational status, and life values. Fifty-five percent of the total sample returned the PES. The largest response came from White students (71%); the lowest response was from Asian Americans (47%). The parents of all nonrespondents were sent a short postcard questionnaire to learn the status of their students. Postcard responses from parents increased the overall response to 73%, but because the information on the postcard was limited to status in 1987, post-graduation information that might explain student status was available only on those who returned the PES.

Data were then collected at a third point in time--in 1990--five years after high school. An attempt was made to contact by telephone all students who had given permission to do so. The remainder were sent a short questionnaire. The total number of students whose outcome status could be determined from the various combinations of survey responses was 3,840 (64% of the original sample).

As a criterion measure, Hilton constructed a persistence scale ranging from a score of "0" for students who never enrolled in science or engineering and showed no subsequent interest after taking the SAT, to a score of "5" for full persistence, which included those students who were either still enrolled as undergraduates in MSE, or had graduated with an MSE degree and were working in an MSE field, or were enrolled in graduate school in MSE. He then used stepwise multiple regression to predict persistence from five blocks of variables (a total of 32 variables) derived from the SDQ and the PES. He found that 14 of those variables had significant regression weights. The largest standardized weight was 0.30, and that variable was personal commitment to MSE early in college.

Other variables, from the most heavily weighted to the least heavily weighted, were early college GPA (β = 0.16), SAT mathematics score (β = 0.10), belief that their high school honors courses were an important influence on their MSE plans (β = 0.10), early college mathematics grades higher than other grades (β = 0.08), attending a four-year college versus a two-year college (β = 0.08), belief that enjoyment of their major was an important influence on their choice to stay in MSE (β = 0.08), belief that interest in their MSE coursework was an important influence on their choice to stay in MSE (β = 0.07), participation in MSE activities in college (β = 0.07), gender (β = -0.06, with female being a disadvantage), second-choice major field also in MSE (β = 0.06), plan to have a professional job at age 30 (β = 0.05), taking advanced mathematics courses in high school (β = 0.05), number of advanced placement courses taken (β = -0.06), and finally, as college students, feeling it was important to make contributions to science (β = 0.05).

When the block of race and ethnicity variables was added last to the multiple regression, it made no additional contribution to the multiple correlation. In other words, when a number of background and experiential variables were held constant, there was no difference in persistence rate attributable to ethnicity.

All in all, the multiple correlation between persistence in MSE and these variables amounted to 0.61. Therefore, only 36% of the variance in the persistence score was explained by all of these variables.

This list of variables gives us some indication of the abilities and experiences related to persistence in MSE. Although multiple regression is the most standard prediction model, it often leaves us with little, if any, understanding of the mechanisms by which these variables affect the outcome, if, in fact, they affect it at all. Because of this limitation and others, we proposed a fifth phase to the project, namely, a comprehensive data analysis with causal modeling.

RATIONALE FOR PHASE V: COMPREHENSIVE DATA ANALYSIS

Although the descriptive analyses and multiple regression of Phase IV provided a good sense of which variables are associated with persistence in MSE, they were inadequate as analytical tools for understanding the process by which the variables affect persistence. Furthermore, multiple regression alone has at least three severe limitations.

First, in a longitudinal study, we measure different variables at different times. Gender affects interests and achievement in high school, which affect interests and performance in college, which affect college outcome. But gender also affects interests and performance in college directly, and all of these affect college outcome, both directly and indirectly. A single regression analysis cannot sort out direct and indirect effects.

Second, the regression weights on the independent variables (prediction variables) depend on two things: (1) the true relationship between the independent and dependent variables, (in this case, between the predictors and persistence), and (2) the reliability of the measurements. When we interpret regression results, we tend to forget about reliability. Gender is a reliable variable. Expressed interest in MSE courses has relatively poor reliability because people interpret the question in different ways and respond differently to rating scales. We refer to a measure having poor reliability as one with a lot of measurement error. Reliability can be improved by asking the same question many different ways and combining the results. That is why a mathematics test has more than one problem. A single question about interests, or about grades, or about the degree to which your father influenced your college plans has relatively low reliability and as a result, will have lower correlations with other variables and will be weighted lower than it should be in a regression equation. That correlation or regression weight is said to be *attenuated* because of measurement error.

Third, ordinary regression analyses deal poorly with variables that are not normally distributed. In survey data, we often have binary variables, such as gender (1=male, 2=female), and we have numerous variables on interval scales (1=strongly disagree, 2=disagree, etc.). The distributions of responses are rarely normal. It is possible, of course, to "normalize" all variables before entering them into a regression analysis, but researchers rarely do this.

With an additional grant from the National Science Foundation, we undertook an entirely new analysis based solely on those minority students who enrolled in college and who completed the PES. The sample was restricted in this way so that nearly complete data would be available on everyone studied. The sample included people who persisted in MSE as well as those who switched majors or dropped out of college.

A structural equation modeling approach developed by Jöreskog and Sörbom (1993), using LISREL, avoids the limitations of multiple regression described above. The approach to the analysis consisted of first laying out a general time line, showing the path of students from one point in time to the next, as shown below.

		• 1985 •				• 1987 •		• 1990 •
Pre-H.S.	→	High School	→	Early college	→	Survey (PES)	→	Status survey

Even though data were collected at three points in time (marked by dates and bullets), the data actually refer to at least five different times. Pre-high school variables, such as gender and socioeconomic status (SES), come first. They can affect everything thereafter. High school experiences, plans, test scores, and grades come next, and they can affect everything thereafter. Early college activities and experiences come next, and they can affect all information collected in the PES survey, such as values, opinions, and early college grades; they can also affect persistence directly. Finally, grades, values, and opinions as stated in the PES affect outcome in 1990: either students are in MSE or they are not. In this *recursive* model, variables are in a causal chain, each affected by all earlier variables, and each affecting all later variables. The first limitation of ordinary multiple regression noted above is avoided by this model in which direct and indirect effects can be separated.

The next step was to define the variables to include in the model and to ensure that they were placed correctly on the time line. This step also dealt with the second limitation we noted concerning ordinary multiple regression, namely, the inability to correct for measurement error. By combining several measures of the same variable into one *latent variable*, the LISREL program provides corrections for attenuation by computing an estimation of the reliability of each measure and increasing the regression weight accordingly. It then produces a set of multiple regression equations relating each latent variable to preceding variables at each point in time. Details of the process by which latent variables were defined will be discussed later.

The third problem with ordinary multiple regression, nonnormality of variables, is handled by normalizing the observed variables before they are entered into the regression analysis. A preprocessing program entitled PRELIS (Jöreskog & Sörbom, 1988) screens the input data, normalizes it, and produces product-moment correlation coefficients for continuous variables (such as SAT scores), polychoric correlations between ordinal variables (such as questionnaire responses on 5-point Likert scales), and polyserial correlations between ordinal and continuous variables. The resulting correlation matrix is input to the LISREL program.

PROCEDURE

Sample

Path analysis, like ordinary regression analysis, produces estimates of how well each independent variable predicts an outcome variable. If some students followed a pathway in life along which they missed a large set of experiences that other students had, they could not answer questions about those experiences, and for obvious reasons, we could not expect to compute estimates of how well those experiences (that they never had) affected their persistence in science. Someone who never enrolled in college, for example, could not answer the large body of questions on undergraduate experiences. One could not guess, statistically or otherwise, how those students would have answered questions on undergraduate experiences if they had them. Students who never enrolled in college were therefore excluded from the analysis, not because they were unworthy of study, but because much of the necessary data for prediction was not available for those students, and the data that were available were not comparable to the data for the rest of the sample.

Because this study focused on persistence of minority students, the comparison sample of White students was excluded from all analyses. Students for whom there were no early college data or outcome data were also excluded. Those students who omitted an occasional question, as nearly all students did, were not excluded. The numbers of students for whom essentially all data were available are shown by ethnic group and gender in Table 1.

Table 1. Sample Size by Gender and Ethnic Group

Ethnic Group	No. Male	No. Female	TOTAL
American Indian	108	38	146
African American	609	505	1,114
Mexican American	495	194	689
Asian American	176	103	279
Puerto Rican	232	97	329
TOTAL	1,620	937	2,557

Fifty-eight percent of the male sample were either working in or studying science or engineering at the time of the final follow-up survey in 1990. Only 48% of the female sample persisted to that status in 1990. However, there was no significant difference among ethnic groups, for either gender, in the percentage who persisted in science and engineering.

Variables

In a path analysis with corrections for attenuation, there are both **measured** and **latent** variables. The distinction between the two types of variables is important.

Measured variables (sometimes called **observed** variables) include test scores, self ratings and self reports, scaled questionnaire responses which include statements of satisfaction, perceived influences of various people and programs, importance of various life activities, and statements about values. All measured variables are fallible in the sense that they may be false, exaggerated, or misunderstood by the person answering the questions. Some students tend to answer questions differently from other students, by marking more extreme responses, for example. Test scores are all subject to random measurement error.

These sources of error result in measures that are less than perfect indicators of the construct they are designed to measure. How well a variable measures what it was designed to measure is one indication of its reliability.

Latent variables are the constructs that the measured variables are designed to measure. SAT mathematics score is a measured variable; "true" mathematical ability is a latent variable. By combining multiple measures of the same ability, we attempt to construct a latent variable. Similarly, by presenting the student with several different statements that reflect the same attitude, an appropriately weighted combination of responses to those statements may be treated as a latent attitudinal variable.

The path analyses conducted in this study first involved the creation of latent variables from measured variables. Equations predicting persistence in science or engineering were then computed from latent variables whenever possible.

The next two sections will describe the measured variables available in the database and the latent variables constructed from them.

Measured Variables. The entire database contains hundreds of high school and college variables. Because of the different pathways students might follow, not all variables are answered by all students. Questions, for example, asking students why they dropped out of school would obviously only be answered by those who dropped out. There is no way to estimate how a persister would have answered a question about why he dropped out. To do so would be to imply a fundamental contradiction. Therefore, to conduct the path analysis, we had to restrict the pool of variables to those answered by all, or nearly all, of the students.

The measured variables included categorical, continuous, censored, and ordinal variables. These distinctions are worth noting.

Categorical variables are ones with no scale, or an arbitrary scale. Examples are gender, ethnic group, whether or not students took an honors course in a particular subject, and whether or not they were "in science or engineering" at a particular point in time. Students were regarded as being in science or engineering if they were enrolled as students (either graduate or undergraduate) and majoring in science or engineering, or if they were employed in science or engineering.

Continuous variables are those with a large number of scaled options, such as SAT verbal scores, which may range from 200 to 800. Scores are distributed between those two extremes, and few people, if any, score at the extremes. Censored variables are continuous variables which have an artificial cutoff. In this database, SAT mathematics score is on a censored scale because only students with scores of 550 or higher were selected for the study.

Ordinal variables are the most common in this database. Their scale is simply an ordering, generally having no absolute zero and with scale interval sizes being unknown. They consist primarily of Likert-type scales, and in the PES survey data, they were designed to measure attitudes, self ratings, perceptions of the degree to which people and programs affected student decisions, degrees of satisfaction with college life, and importance of participating in various activities in the future.

Latent Variables. Each latent variable consisted of several measured variables. Socioeconomic status is a latent variable made up of father's and mother's education and family income. Each latent variable is a construct represented by a factor in the factor-analytic sense. Because it consists of more than one measured variable, its reliability is generally much higher than that of a single measured variable.

Unlike the earlier analysis by Hilton et al (1994), the path analysis used criterion variables defined in terms of the student's status at a particular point in time. Two such variables were defined, one as an indicator of status in 1987, when the student completed the PES, and the other as an indicator of status in 1990, when the final follow-up survey was conducted. Each student was given a score of "1" if he or she was "in science or engineering" and a score of "0" otherwise[2]. It was most important, because the path analysis dealt with events at several points in time, to define variables so that they were placed at the proper point in time. They could not be defined in such a way as to imply a process over a period of time, otherwise a cause and effect could easily get reversed or placed incorrectly.

Four measured variables--gender, type of college attended (2-year or 4-year/university), self-reported college science grade average, and status in 1990--were treated as latent variables because there was only one measure available for each of these variables.

Preparation of Data

LISREL accepts as input either a correlation matrix or a variance/covariance matrix. Because the survey data consisted of a mixture of ordinal, continuous, dichotomous, and censored variables, the input matrix was prepared using the PRELIS 2 program (Jöreskog & Sörbom, 1988; Jöreskog & Sörbom, 1993b). The input matrix contained, in each cell, the type of correlation appropriate to the scales of the particular pair of variables. For example, the value entered in the matrix for the correlation between SAT verbal score and score on the Test of Standard Written English would be a product-moment correlation coefficient. The value for the correlation between the two dichotomous variables, gender and status in 1990, would be a tetrachoric correlation coefficient. Because it is assumed that each variable has an underlying standard normal distribution, variables are first normalized before correlations are computed. Missing values, because they appear to occur more or less at random, are treated by pairwise deletion.

---

[2] Respondents were regarded as "in MSE" if they were employed in a science or engineering field or if they were enrolled in MSE either in undergraduate or graduate school. There were very few whose status was difficult to resolve. If a respondent was still in college majoring in engineering but was employed outside engineering, he or she was still regarded as "in MSE," the assumption being that the employment was temporary and providing an income while the person was completing an engineering education.

Building and Testing Models

The procedure for developing and testing models is anything but an easily explained procedure that follows well-defined steps. It is a hypothetico-deductive process that begins with an expectation of one way in which variables may affect other variables. That expectation is based on theory (educational, psychological, sociological, economic, or causal/logical[3]). The researcher sets up an expected model and then uses LISREL to test the fit of the model to the data. Very often the expected model fits so poorly that no solution is reached. Some models will fit the data poorly, but the way in which the model fits and misfits can be known by the information the LISREL output provides. In those instances, the model can be adjusted (provided the adjustment makes sense), and the modified model can be tested. When a hypothesized model fits well, LISREL prints a solution, which includes a variety of statistics that will be discussed later. For all of the analyses discussed below, a maximum likelihood (ML) solution was generated, using the input matrix of correlations discussed earlier.[4]

The first models built and tested were designed to establish latent variables. These **measurement models** test whether, and how well, each of a group of selected variables loads on the same factor. That factor represents the latent variable. Standardized factor loadings associated with each measured variable are interpreted as standardized validity coefficients. Correlations among factors, because they eliminate the effects of measurement error in the observed variables, are the disattenuated correlations among latent variables. The disattenuated correlations are higher than the zero-order correlations among observed variables.

---

[3] By causal/logical I am referring primarily to chronological and logical sequences. Gender and race may causally affect test scores, but not vice versa. Events occurring in high school can be the cause of college outcomes, but not vice versa. Simultaneous variables, such as race and gender, cannot cause one another. Similarly, even if two observed variables happened to be highly correlated, they would not be set up to load on the same factor unless there were good reason to believe they measured the same construct. That would make no logical sense and would not contribute to our understanding of the process we were studying even if a model having no logical sense happened to fit the data.

[4] It is generally recommended that ordinal variables be analyzed by the weighted least squares method, but to do so requires the asymptotic covariance matrix as well as the matrix of correlations. The asymptotic covariance matrix requires complete data on the part of all subjects. Because of the large number of variables in the models tested, to include only those students who answered all questions would reduce the size of the sample to near zero. Furthermore, Jöreskog & Sörbom (1988) have conducted a number of experiments comparing LISREL analyses of variables having different scale types and have found that despite the fact that ML assumptions were not met, ML still gave good results.

For example, a latent variable for Minority Support in College is constructed from three variables in the PES. The three variables are measured on ordinal scales, and the individual responses are likely to have only fair reliability. They fit a single factor, however, with quite high standardized factor loadings, the largest being associated with the availability and effect of minority and/or female role models and advisors. The polychoric correlation between this item and status in 1990 was .20. The disattenuated correlation between outcome status and the latent variable for Minority Support, which included this item, was .30.

Following the construction of latent variables, recursive models were developed in which variables at one point in time predicted variables at a later point in time, which in turn, predicted later variables. Both direct and indirect effects of earlier variables on later variables could, therefore, be estimated.

The testing and fitting of these models required many attempts to represent real-world processes with the best possible fit. The reason many models must be tried and modified and tried again is twofold.

First, no measurement model is perfect and unique. Quite often, one questionnaire item measures two or more constructs, and therefore loads on two or more factors, to some degree. The result of placing the measured variable on one or the other factor results in an error variance that reduces the degree of fit of the model, but does not generally affect the interpretation of the model.

Second, some latent variables are highly correlated with each other, but are not identical with each other. Allowing both latent variables to enter a model results in multicolinearity (just as we find with two highly correlated independent variables in an ordinary regression analysis), resulting in the regression weight on one variable reversing sign. When this occurred, one of the latent variables was removed, and the one explaining the most variance in the dependent variable was allowed to remain. This was a less-than-satisfactory solution to the problem because it did not explain the role played in real life by the discarded latent variable.

Both of these problems occurred frequently, primarily because there were so many variables in the database, and an attempt was made to enter as many as possible into the model so that their roles in a student's development could be best understood. In the results that follow, we will present the best-fitting and most comprehensive path model we were able to develop. This is not the only possible model.

ANALYSIS AND RESULTS

Correlations among Measured Variables

Appendix A lists and defines all of the measured variables that were considered for input to the prediction model. The last variable in the list, MSE90, is either 1 or 0, depending on whether the person is "in MSE" or not in 1990. Variables are arranged in chronological order, with the SAT/SDQ variables appearing first, then the PES variables, then MSE90, which was gathered in the final follow-up survey.

A glance at Appendix A, which also shows the correlation between each item and MSE90 reveals that the correlations of MSE90 with early events (high school and family variables) were low, whereas correlations with many later events (college variables) were quite high. Recall that these later events were still three years before the final status measure in 1990, suggesting that whether a student will be in MSE at or after graduation is fairly predictable by the end of the sophomore year of college.

This pattern showing the outcome to be less correlated with early events than with later events does not imply that early events had little effect on outcome. What the pattern suggests is that early events had little DIRECT effect on outcome. In fact, some early events were highly correlated with college variables, such as the type of college the student entered, and those college variables, in turn, had direct effects on student outcome. The early events, therefore, did have their effects on student outcome, but the effects were INDIRECT. (Appendix B shows the full correlation matrix.) It is the purpose of the path model to separate direct and indirect effects so that the process by which events had their effect can be better understood.

Best-Fitting Solution

A very large number of models were developed and tested, beginning with small models having only a few latent variables. The small models generally fit the data quite well but explained little of the outcome. Most large models, on the other hand, misfit in some way. The best-fitting large model, which accounted for 61% of the variance in outcome, contained twelve latent variables. The complete output from the LISREL run is shown in Appendix C.[5] Each of four of the latent variables consisted of just one measured variable because there was only a single measure available. These variables were gender, college type, self-reported grade average in early college MSE courses, and outcome.

Table 2 lists the other eight latent variables, each of which was made up of two or more measured variables. The left-most column lists the abbreviation used for each latent variable in the LISREL program; its description is in the second column. The abbreviation for each measured

---

[5] This model was judged to fit the data well, in spite of its large χ^2, for several reasons. The standardized root-mean-square residual (RMR) was only 0.065. The goodness-of-fit index (GFI) was 0.89. The pattern of residuals did not contain any large residual. A non-zero error covariance existed between CLUBS and STUDGOVT, indicating that people who responded that they were in student government were also in clubs. An examination of the standardized residuals in the LISREL output shows that it was primarily this type of trivial correlation that contributed to the misfit of the model.

Table 2. Definition of Each Latent Variable and Standardized Factor Loading (λ) Associated with Each Measured Variable

Latent Variable		Measured Variable		
Abbrev.	**Description**	**Abbrev.**	**Description**	**λ**
Ses	Socioeconomic status	FATHEDUC	Father's education	0.89
		MOTHEDUC	Mother's education	0.74
		INCOME	Family income	0.61
MSciAch	Math & science achievement	PHYSGRD	Latest (high school) grade in physical sciences	0.80
		MATHGRD	Latest (high school) grade in math	0.68
		BIOGRD	Latest (high school) grade in biological sciences	0.66
		SATM	SAT mathematics score	0.37
Social	Interpersonal/leadership achievements	LEADABIL	Self rating, leadership ability	0.88
		SPEAKABL	Self rating, ability in spoken expression	0.69
		OTHRABIL	Self rating, getting along with others	0.66
		CLUBS	Level of partic. & leadership in clubs	0.48
		STUDGOVT	Participation in student government	0.48
		COMMSERV	Level of partic. & leadership in community/church	0.34
ColMin	Minority support early in college	Q19L	Minority or female role models and advisors	0.83
		Q19H	Advice & support from advanced students in same ethnic group	0.76
		Q19Q	Dedicated minority relations staff	0.72
SciAmbit	Science ambition early in college	Q21M	Importance of making practical scientific or technological contributions	0.94
		Q21Q	Importance of discovering new frontiers in science or technology	0.92
		Q21N	Importance of contributing to scientific theory	0.91
Security	Importance of security & success	Q21E	Importance of being able to find steady work	0.83
		Q22C	Importance of job security and permanence	0.81
		Q21A	Importance of being successful in own line of work	0.50
Service	Importance of being of service	Q21R	Importance of serving the public interest	0.72
		Q21J	Importance of working to correct social or economic inequalities	0.70
		Q21P	Importance of being an inspiring teacher or role model	0.63
		Q21F	Importance of being a leader in my community	0.63
Commit	Enjoyment of science and making a commitment early in college	Q19S	Found MSE field to which I could make commitment	0.97
		Q19R	Enjoyment of chosen major field	0.92

variable in the LISREL program is listed in the next column, followed by its description in the following column. The right-most column lists the standardized factor loading associated with each measured variable.

The intercorrelations among the latent variables are shown in Table 3. These correlations, because they have been corrected for attenuation, are different from the correlations of their component variables shown in Appendix A and B. From this table, we see that the latent variable entitled Commit, which is composed of two statements from the PES expressing the enjoyment of their field of study and willingness to make a commitment to it, is the most highly correlated with Outcome. Understanding how the remaining variables affected that enjoyment and commitment cannot be known from the correlation table alone.

Table 3. Disattenuated Correlations among Latent Variables
(N = 2,410)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Gender	1.00											
(2) SES	0.10	1.00										
(3) Math/Sci Achievement	0.07	0.06	1.00									
(4) Social Achievement	0.15	0.15	0.02	1.00								
(5) College Type	0.09	0.22	0.33	0.12	1.00							
(6) College Minority Suppt.	0.10	-0.07	-0.01	0.12	0.20	1.00						
(7) Science Ambition	-0.17	-0.05	0.16	0.03	0.07	0.31	1.00					
(8) College Science Grades	0.00	0.06	0.41	-0.06	-0.05	0.03	0.09	1.00				
(9) Security	-0.01	-0.10	-0.06	-0.02	0.00	0.26	0.08	-0.01	1.00			
(10) Service	0.13	-0.07	0.06	0.30	0.16	0.34	0.10	0.00	0.07	1.00		
(11) Commitment	-0.14	-0.01	0.21	0.01	0.02	0.51	0.70	0.24	0.16	-0.02	1.00	
(12) Outcome	-0.17	0.02	0.21	-0.08	0.17	0.30	0.54	0.24	0.12	-0.11	0.74	1.00

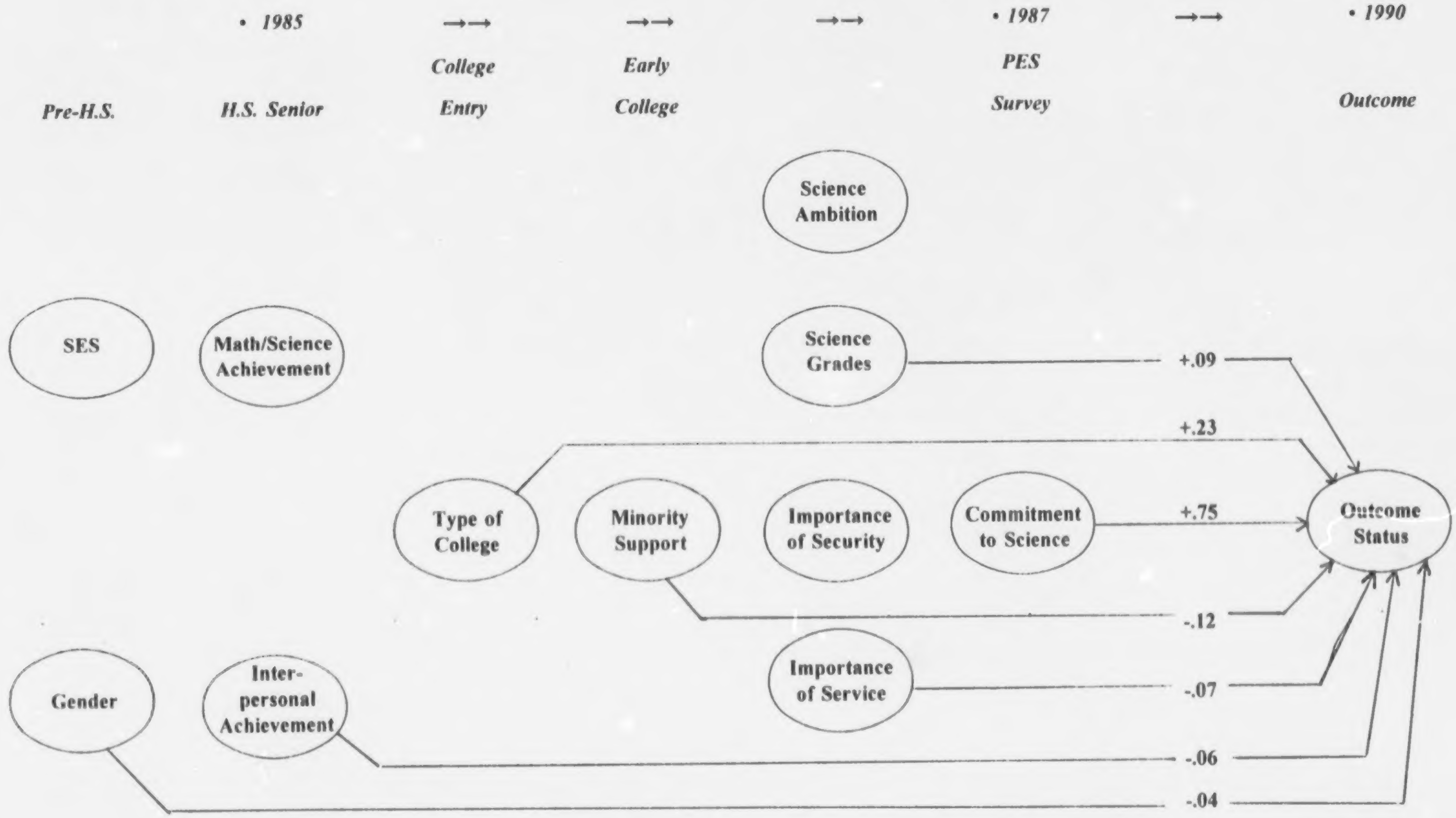
Direct Effects on Outcome in 1990. Figure 1 is a path diagram showing the latent variables arranged along a time line. The causal arrows show the DIRECT effects of each preceding variable on Outcome. Numbers on the arrows are standardized regression weights. The three variables (SES, Math/Science Achievement, and Science Ambition) showing no arrow to Outcome did not, according to the model, have any direct effect on Outcome. One might ask how this is possible, given that Science Ambition, for example, is correlated 0.54 with Outcome (Table 3). According to the model, Science Ambition works indirectly through Commitment to science. The desire to make scientific or technological contributions, according to the model, results in a commitment to science or engineering as a career. It is that commitment that keeps the student on course for three more years.

Although data were collected at only three points in time, questions in the SDQ and PES refer to different points in time, and furthermore, some events, for logical reasons, must have preceded others. For example, it is likely that Minority Support early in college affected Science Ambition, rather than vice versa, even though the questions were answered at the same time. The questions on Minority Support require reflection over the first two years in college, whereas the questions on Science Ambition refer to the person's feelings at the moment he or she answers the questions.

One might wonder, however, why commitment to science should occur after, say, science ambition. The reason is that the model was first tested with all of the latent college variables occurring simultaneous. Science ambition and commitment were so highly correlated that they caused a colinearity problem. There were two possible remedies: either one latent variable or the other had to be removed from the model, or, one had to be placed later than the other. Because there was a good logical reason to do so, commitment was placed later than science ambition. If the model had not made sense by placing one variable later than the other, the latent variable contributing most to explaining the outcome (the one with the larger standardized regression weight) would have been retained.

Figure 1

Best Fitting and Most Comprehensive Model
Showing Direct Effects on Outcome Status


• 1985
College Entry
Early College
• 1987
PES Survey
• 1990
Outcome
Pre-H.S.
H.S. Senior
Science Ambition
SES
Math/Science Achievement
Science Grades
+.09
+.23
Type of College
Minority Support
Importance of Security
Commitment to Science
+.75
Outcome Status
-.12
Gender
Inter-personal Achievement
Importance of Service
-.07
-.06
-.04

Commitment to MSE in 1987 had the greatest power to predict whether the student was in MSE in 1990. The second most important direct effect was type of college attended. This says that not only did the type of college have indirect effects explained by differences in minority support systems, differences in values acquired in each type of college, and differences in knowledge acquired as reflected in MSE grades, but the type of college had other kinds of effects on persistence. Students attending four-year colleges and universities during their sophomore year were more likely to be in MSE three years later[6].

The other variables shown in the model had little direct effect on outcome, though their factor loadings were statistically significant. MSE grades early in college had a direct effect on outcome three years later. What is surprising is that the effect was not larger. We must keep in mind here that these are self-reported grades, and students do not always report grades accurately.

Minority support, according to the model, has a small negative direct effect on outcome. This reversal of sign on the regression weight is a colinearity effect that could not be removed without removing the minority-support factor from the model altogether. Because the effects of minority support systems are important in this study, the factor was retained. The negative sign should not be taken seriously because minority support is seen to have very positive indirect effects which will be discussed later.

Interpersonal achievement, which includes leadership, self ratings on interpersonal skills, as well as participation in clubs in high school, has a slight negative effect on outcome. This result is not new; Sax (1994) found that for men, self-rating on popularity was negatively related to persistence in science.

---

[6] Further analyses could be done to examine in detail the transfer patterns from 2-year to 4-year colleges, and their relationships with persistence. Such an analysis would constitute a separate study and was regarded as beyond the scope of this project.

The importance of being of service also had a small negative impact on persistence. Not surprisingly, the need to be of service was correlated with the interpersonal achievement factor in high school. This finding was consistent with research on college seniors taking the Graduate Record Examinations in preparation for graduate school. Those planning to leave MSE for another graduate field, after earning a bachelor's degree in MSE, were more likely to value making a contribution to society than were the students planning to continue in MSE (Grandy, 1992).

Gender had a very small direct effect on outcome. The path coefficient was only -0.04 (favoring males), but Table 3 showed the correlation between gender and outcome to be -0.17. Most of the correlation of gender with outcome is accounted for by the intermediate variables in the model. These will be discussed individually later.

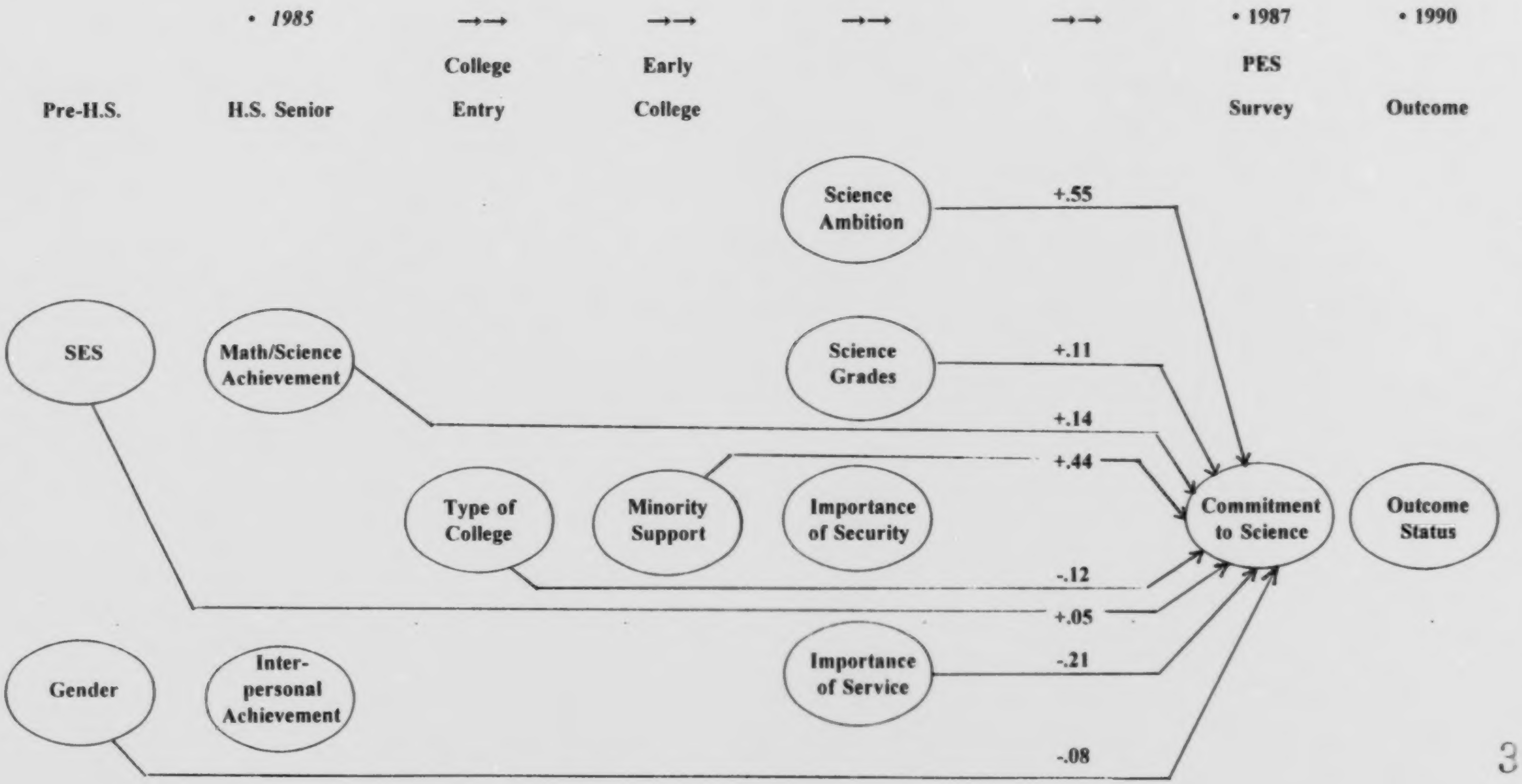
Direct Effects on Commitment to MSE. Because willingness to commit oneself to MSE by the sophomore year of college had such an important bearing on whether the student was still in MSE in 1990, the next part of the analysis worthy of discussion is shown in Figure 2, direct effects on commitment. The largest standardized factor loading, discussed above, was 0.55, which was associated with the Science Ambition factor.

Second most important was Minority Support, with a loading of 0.44. Students who indicated that they had minority role models, advice and support from advanced students of their ethnic group, and a dedicated minority relations staff were more likely to make a commitment to MSE by their sophomore year of college. Having made that commitment, they were more likely to persist through graduation. Minority support worked both directly and indirectly to affect commitment. Indirect effects will be discussed shortly.

Importance of service to society or the community has a small negative effect on commitment to science as it does on outcome in 1990.

Figure 2

Best Fitting and Most Comprehensive Model
Showing Direct Effects on Commitment to Science


• *1985*
→→
→→
→→
→→
• 1987
• 1990
College
Early
PES
Pre-H.S.
H.S. Senior
Entry
College
Survey
Outcome
Science Ambition
+.55
SES
Math/Science Achievement
Science Grades
+.11
+.14
+.44
Type of College
Minority Support
Importance of Security
Commitment to Science
Outcome Status
-.12
+.05
Gender
Inter-personal Achievement
Importance of Service
-.21
-.08

Type of college attended is shown as having a negative effect on commitment to science. This negative sign is another case of colinearity; the type of college attended is actually uncorrelated with commitment, but it does work indirectly and positively on commitment through other college variables discussed below.

Math/science achievement in high school shows some small direct effect on commitment to MSE in college. Insofar as high school mathematics and science grades as well as SAT mathematics score reflect ability and preparation in MSE, we would expect those abilities to affect later commitment to MSE. Most of that effect, however, is indirect, through early college experiences and performance in MSE.

College science grades, although moderately correlated with commitment, have a lesser effect on commitment when other variables are taken into account.

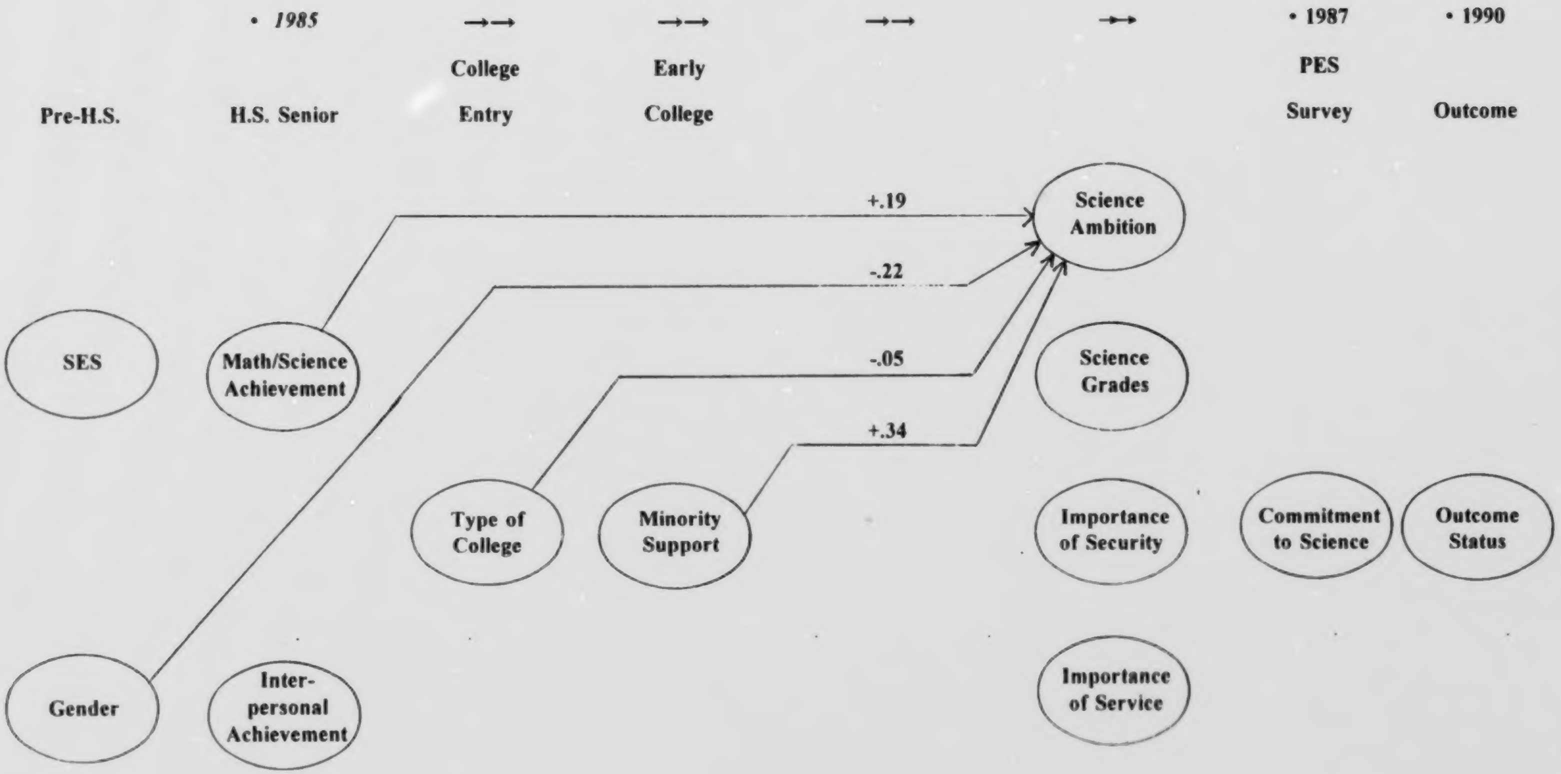
There is a small direct effect of gender on commitment. Aside from ability, performance, minority support, or other variables in the model, males are still more likely to commit themselves to MSE than females are. Whatever other reasons females have for being less likely to commit themselves, those variables are not included in this model.

Direct Effects on Science Ambition. Because science ambition has an important effect on commitment, we will examine the variables that effect science ambition. Figure 3 shows that, in this model, the most important variable affecting science ambition is minority support. Those students who indicated that they had minority role models in college, that they received advice and support from advanced students of their own ethnic group, and had dedicated minority relations staff were more likely to feel that it was important to them to make scientific or technological contributions, to discover new frontiers in science or technology, or to contribute to basic scientific theory.

Gender had a relatively large effect on science ambition. Making the kinds of contributions and discoveries that scientists and engineers make is less important to female than male students, on

Figure 3

Best Fitting and Most Comprehensive Model
Showing Direct Effects on Science Ambition


• 1985
→→
→→
→→
→→
• 1987
• 1990
Pre-H.S.
H.S. Senior
College Entry
Early College
PES Survey
Outcome
+.19
-.22
-.05
+.34
Science Ambition
SES
Math/Science Achievement
Science Grades
Type of College
Minority Support
Importance of Security
Commitment to Science
Outcome Status
Gender
Inter-personal Achievement
Importance of Service

average. In fact, according to this model, it primarily through this factor of science ambition, rather than grades, for example, that females are less committed to MSE and less likely to persist.

Math/science achievement in high school had a relatively small but direct positive effect on science ambition in college. The type of college attended had very little, if any, direct effect; the negative sign on the factor loading indicating some colinearity. Type of college had a very low correlation with science ambition, but had some positive indirect effect through the availability of minority support systems, discussed next.

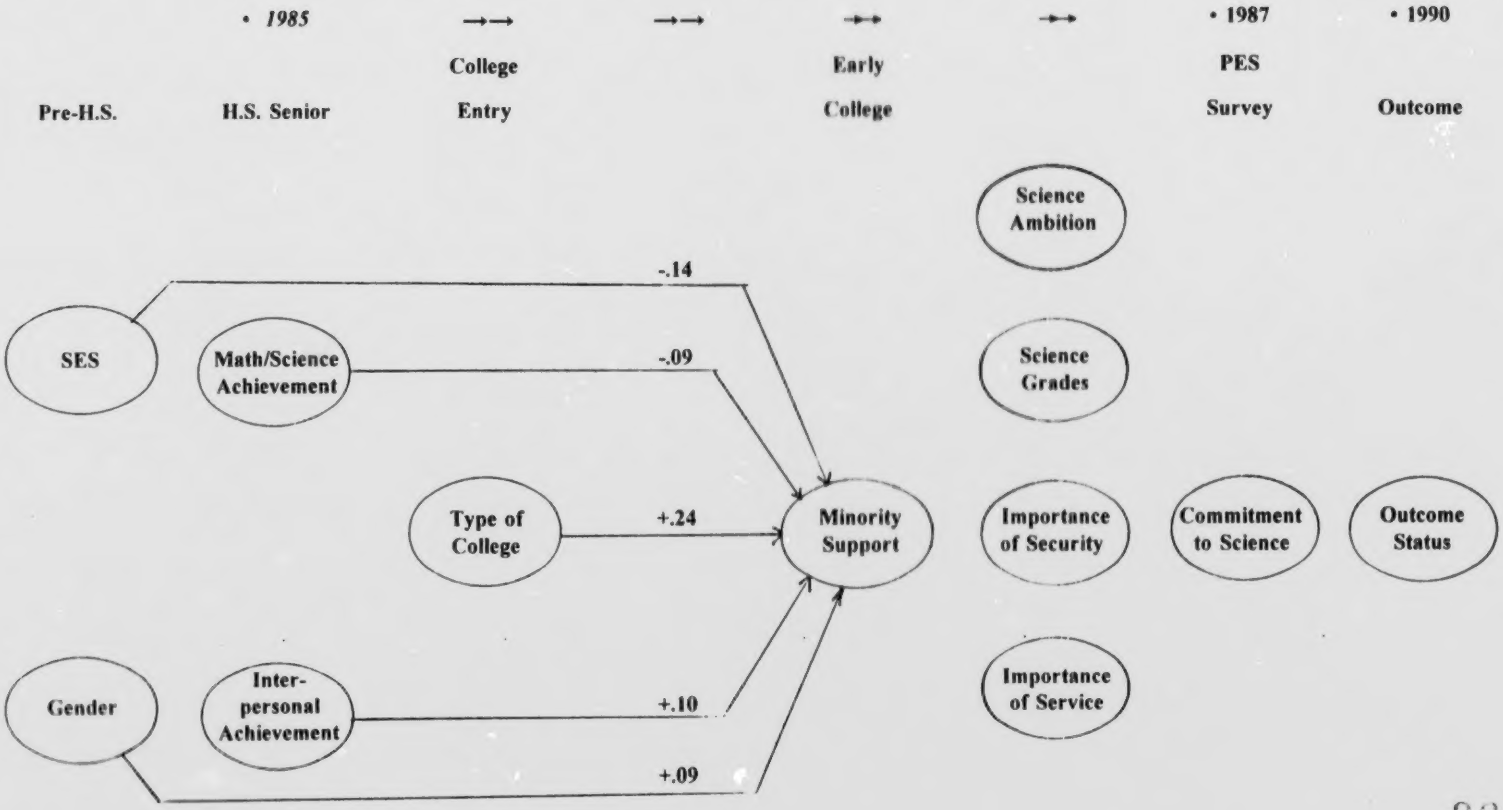
Direct Effects on Availability of Minority Support. Minority support, we saw, had positive direct effects on science ambition and commitment to science. Are there any variables in the model able to predict which students were most likely to receive minority support?

Only 8% of the variance in minority support could be explained by the earlier variables in the model. Figure 4 shows that the best predictor was the type of college attended. Students in four-year colleges and universities indicated receiving more minority support than did students in two-year colleges.

Those who had participated in more clubs and organizations in high school and who apparently had greater leadership and interpersonal skills also tended to report receiving more minority support in college than did students who had participated less in social interaction in high school. It is quite possible that there is an underlying social or extraversion variable at play here, and that students who seek out more social contacts in high school also seek out minority support systems in college. This interpretation is consistent with the finding that female students are slightly more likely than male students to indicate that they received minority support in college. Females, more than males, also reported greater interpersonal achievement in high school. So, interpersonal achievement, "femaleness," and minority support in college tend to be associated, but not very strongly.

Figure 4

Best Fitting and Most Comprehensive Model
Showing Direct Effects on Minority Support in College


• *1985*
→→
→→
→→
→→
• 1987
• 1990
College
Early
PES
Pre-H.S.
H.S. Senior
Entry
College
Survey
Outcome
Science Ambition
-.14
SES
Math/Science Achievement
-.09
Science Grades
Type of College
+.24
Minority Support
Importance of Security
Commitment to Science
Outcome Status
Gender
Inter-personal Achievement
+.10
Importance of Service
+.09

There is a slight tendency for students of lower socioeconomic status and lower math/science achievement in high school to indicate that they received more minority support in college. It seems likely that these students sought out minority support because their need for support may have been the greatest.

Direct Effects on Type of College Attended. The last diagram, Figure 5, shows that the strongest predictor of type of college attended was math/science achievement in high school, with students earning the highest grades and test scores being more likely to attend a four-year college or university.

To a lesser degree, students from better educated families having higher incomes also were more likely to attend these institutions. To a small extent, the "leaders" and generally more social students were also more likely to attend four-year colleges and universities. Any gender difference in type of college attended was totally accounted for by SES, math/science achievement, and interpersonal achievement.

Discussion of Effects of Each Variable on Persistence

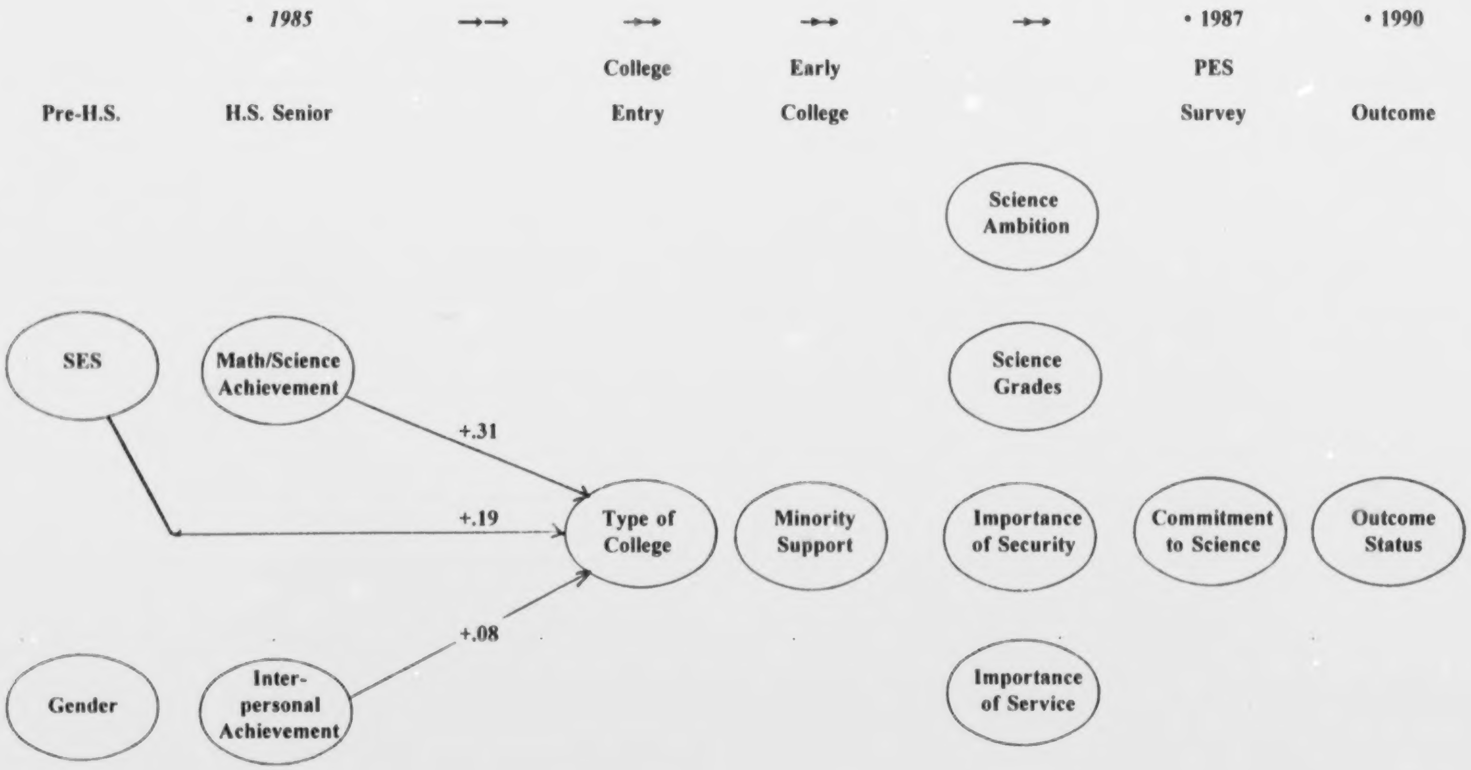
The previous discussion focused on direct effects of all earlier variables on each later variable. A somewhat different understanding is achieved by focusing on the role of each latent variable in the model. This section will discuss the findings in this way.

Gender. The original correlation matrix showed gender to be correlated -.16 with whether or not students were still in MSE in 1990. Just what events, between high school and a point in time five years after graduation, might account for the greater loss of females than males from the MSE pipeline?

We see from the model that math/science achievement in high school is NOT a factor. To the contrary, although females earn lower SAT mathematics scores, their self-reported grades in all courses, including physical sciences, are higher than the grades of males. Gender is uncorrelated with

Figure 5

Best Fitting and Most Comprehensive Model
Showing Direct Effects on Type of College Attended


• 1985
• 1987
• 1990
College Entry
Early College
PES Survey
Pre-H.S.
H.S. Senior
Outcome
Science Ambition
SES
Math/Science Achievement
Science Grades
+.31
+.19
Type of College
Minority Support
Importance of Security
Commitment to Science
Outcome Status
+.08
Gender
Inter-personal Achievement
Importance of Service

self-reported grades in MSE in college. Therefore, it is not grades that keep females from persisting in MSE.

Interpersonal achievement and activities in high school may, to some small degree, distract MSE students from their goal. Because female students participate more in these social and leadership experiences than do males, the greater social emphasis in their lives appears to have a slightly negative effect on persistence.

Females, slightly more than males, attend four-year colleges and universities. Students attending four-year colleges and universities are more likely to persist in MSE. Therefore, the type of college attended should actually enhance the female student's chances of persisting.

According to the model, the primary college variables that explain the lower persistence rate of female students are science ambition and willingness to make a commitment to MSE. Whatever reasons female students may have for leaving MSE, they are apparently not intellectual reasons but reasons based on what they want to do with their lives.

Socioeconomic Status. The family backgrounds of minority students in this study cover a broad range. Some have parents with no high school degree, and approximately one-fourth have a parent with a graduate or professional degree. This sample of students cannot, as a whole, be regarded as economically or educationally disadvantaged.

It is perhaps surprising that SES did not play a greater role in student persistence. Although students from lower SES families did tend to have lower test scores in high school and were less likely to attend a four-year college or university, their college experiences appeared to compensate for these early disadvantages. The zero-order correlation between MSE90 and father's education was only 0.01. Thus there was no relationship between father's education and whether or not a student was still in MSE in 1990. There was only a very small relationship ($r = 0.05$) between MSE90 and mother's education, and no relationship with family income. Of all the variables in the model, minority support in college appears to have had the greatest influence in overcoming the early disadvantages of a lower SES background.

Math/Science Achievement in High School. This factor correlated 0.21 with student outcome in 1990. Recalling that the sample consisted of minority students scoring 550 or higher on SAT mathematics, we would expect the correlation to be much higher for the full population of SAT takers. Among high-scoring students, however, this factor still has an important effect on persistence insofar as it affects the type of college attended and the ability to earn high grades in college MSE courses.

Interpersonal Achievement in High School. This variable, which consists of leadership activities, self ratings of leadership and interpersonal skills, and participation in various organizations in high school, has some small but notable effects on students' pathways through college. These activities in high school have a small positive effect on getting into a four-year college or university and on finding minority support in college. They are moderately related to the need to find a career that performs a service to society or to the community. But they tend not to contribute to persistence in science. Rather, they work to a small extent either as a distraction from MSE or perhaps they represent a set of social values that are not satisfied by a commitment to MSE. Although the negative relationship of interpersonal achievements to persistence in MSE is not a strong one, it has also been noted elsewhere (Sax, 1994).

Type of College Attended. Students who were attending a four-year college or university during their sophomore year were more likely to persist in MSE than those who were attending a two-year college at that time. The model also showed that students in four-year colleges and universities indicated greater minority support. Part of the minority support factor was the statement that advice and support from advanced students of their own ethnic group were available. We may assume that students in two-year colleges were less able to envision their futures beyond the sophomore year because there were no older students, especially minority students, who could offer advice and support and with whom they could identify. Perhaps, in addition, the need to transfer to another institution to complete their studies may serve as an obstacle to their completion. We might expect it to be easier for students to finish what they are already doing than to apply to other institutions during their sophomore year and have to make the necessary move.

Minority Support. According to the model, this factor appeared to have a very important effect on science ambition and commitment to science during the sophomore year, which, in turn, had the greatest effect on status in 1990. Students in four-year colleges and universities appeared to received the greatest minority support, probably because of the availability of older students and role models of the same ethnic group who could advise and direct them. Minority support had little effect on grades; its primary effect was on the affective domain: science ambition, attitudes, enjoyment, and willingness to make a career commitment.

Grades in MSE. Grades in MSE had less of an effect on outcome than interest and commitment did. It is possible that students were not quite accurate or honest about their grades. If we had had transcript data, we might have found grades to be a better predictor. Furthermore, because these students were of high ability to begin with, higher or lower levels of ability within this range may not have had a great bearing on student outcome.

It may also be the case that motivation is truly more important than grades. Variables in the PES are not specific enough to sort out all of the attitudinal variables. They are all highly intercorrelated but do not load on a single factor. Problems of multicolinearity prevented the addition of other variables, such as satisfaction with instructors or access to computers, into the model.

Science Ambition. The desire to make significant contributions to science or technology, according to the model, was the greatest driving force in making a commitment to MSE. For this sample, minority support in college appeared to kindle and maintain that desire.

The Need for Security. One of the apparent effects, or at least one of the correlates, of minority support was recognition of the importance of being able to find steady work, job security, and success. This need was not related to persistence in MSE, however, but was retained in the model to show its association with minority support.

The Need to Be of Service. A career in MSE is probably not often seen as performing a service. The desire to be of service is moderately correlated with minority support, and according to the model, it is positively affected by the minority support system. The desire to be of service has a small negative effect, however, on persistence in MSE. This pattern of influences suggests that for some MSE students, minority role models and advisors affect students by making them more aware of their ability to serve society and to effect social change, especially if these students were active in student government and organizational leadership in high school. At some point early in college, or later, they switch majors from MSE to a field in which they believe they are more likely to make a contribution. These results are consistent with other research cited earlier.

Commitment to MSE. What is perhaps most remarkable is that the commitment to MSE in sophomore year of college is such a good predictor of MSE status three years later. These two questionnaire items, involving commitment to MSE as a career and enjoyment of MSE as a major field, account for over half of the variance in MSE status three years later.

One thing this model has attempted to do is to explain how minority students in their sophomore year of college were able to arrive at a point at which they could make a career commitment. The model has shown that commitment could also be predicted by a number of background variables, and that 67% of the variance in the commitment variable could be explained by science ambitions, minority support systems, grades, and other background variables.

A Remaining Question

One curious result of the analysis was that the model provided no explanation for the lower persistence rate of females. Results of interviews conducted by the author (unpublished) suggest that some female college science students experience a conflict between their passion for science and their desire to have a family, believing that a science career is too demanding and will not allow them sufficient time with family. There were a set of questions in the PES that pertained to what might be termed "family values." They included importance of finding the right person to marry and having a happy family life, having children, and being able to give children better opportunities than they have had. An attempt was made to include this latent variable in the model, but the LISREL program was unable to compute a solution.

One hypothesis to explain why a solution could not be reached is that family values works differently for men and women. The interview results suggest that it may be a positive incentive for choosing an MSE career for males and a negative incentive for females. To test this hypothesis further, and to see if other variables in the model worked differently for males and females, we tested the model separately for each gender.

Comparison of Separate Models for Males and Females

The question as to whether the same model holds for both males and females is one that can be answered by testing the model for both groups. Methods of testing the equality of factor structures and the psychometric properties of variables for two different samples have been developed by Werts, Rock, Linn & Jöreskog (1976 and 1977). For our purposes here, such a rigorous test should not be necessary. One might expect the factors affecting persistence in science to be somewhat different, or at least differently weighted, for males and females. Furthermore, we might expect some factors, such as family values, to affect each gender in a different way. What follows shows how surprisingly similar the models are for both genders.

We first attempted to put the latent variable for family values in the model and run it just for the male sample. Again, the LISREL program found no solution, so we left it out of the male model. The solution to the final model for males can be found in Appendix D.

For the female sample, the latent variable entitled "security," which included the importance of finding steady work and having job security, did not fit into the model. No solution was reached, so we removed security and inserted the latent variable for family values. This model fit quite well. Appendix E shows the LISREL solution.

For the male sample (N = 1,510), the path model was nearly identical with the model fitted on the total sample. The fit was about the same (RMR = 0.07, GFI = 0.88), and the variance explained by the model was 63% (compared with 61% for the combined sample).

For the female sample (N = 900), the model fit quite well with the inclusion of family values (RMR = 0.07, GFI = 0.87) and explained 63% of the variance. Contrary to the hypothesis based on interview data, family values played a small but positive role in persistence, being correlated 0.12 with commitment to MSE early in college and 0.05 with outcome in 1990.

Other than the two latent variables--security and family values--being different for the two groups, the models were nearly the same. Some minor ways in which the measurement models differed for the two groups are worthy of mention. The factor loading on Math/Science Achievement associated with SAT mathematics score was higher for males than for females (0.44 versus 0.28). Importance of being an inspiring teacher or role model loaded more heavily on the need-to-be-of-service variable for males than for females (0.66 versus 0.55). For females, mother's education and family income played a slightly greater role in the definition of SES for males than they do for females. These differences are rather hard to interpret and may not lend any meaningful interpretation to differences in the models.

Table 4 shows the correlations among the latent variables for each gender. The outcome was correlated somewhat more highly with high school math/science achievement for males than it was for females (0.17 versus 0.25). Social achievements in high school, found to have a slight negative correlation with outcome for males, is not at all correlated with outcome for females (-0.10 versus 0.00).

A greater difference in the correlation matrices comparing males and females is the disattenuated correlation between college type and outcome. For males, that correlation is 0.25, indicating that males who attend four-year colleges and universities are more likely to persist in science than those who attend two-year colleges. For females, this correlation is trivial (0.04); there is essentially no relationship between college type and persistence.

Minority support in college also appears to be more important to persistence for females than for males. However, the question loading most heavily on the minority-support factor is "Minority or female role models and advisors." This factor, therefore, includes female support as well as minority support for the female minority sample. In the model for females, therefore, this latent variable should be renamed "female and minority support" and given a somewhat different interpretation.

Examination of the correlations among latent variables is useful but does not separate the direct and indirect effects of the variables on student status in 1990. To do this we must examine the path coefficients. All of the path coefficients are shown for each gender in Appendixes D and E. Those worthy of note and are as follows:

For males, there is a small negative relationship between math/science achievement in high school and whether they availed themselves of minority support systems in college. For the female sample, there is no relationship. This difference may be due to the fact that for females, minority support systems include female support systems.

Table 4
Disattenuated Correlations among Latent Variables

Male Sample (N = 1,510)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) SES	1.00										
(2) Math/Sci Achievement	0.06	1.00									
(3) Social Achievement	0.14	0.01	1.00								
(4) College Type	0.24	0.31	0.13	1.00							
(5) College Minority Suppt.	-0.08	-0.05	0.13	0.23	1.00						
(6) Science Ambition	-0.01	0.20	0.03	0.13	0.29	1.00					
(7) College Science Grades	0.08	0.43	-0.08	-0.03	-0.02	0.09	1.00				
(8) Security	-0.10	-0.05	-0.02	0.05	0.22	0.06	-0.03	1.00			
(9) Service	-0.10	0.03	0.32	0.16	0.34	0.10	-0.03	0.07	1.00		
(10) Commitment	-0.01	0.20	0.02	-0.01	0.48	0.65	0.30	0.10	-0.02	1.00	
(11) Outcome	0.04	0.25	-0.10	0.25	0.26	0.53	0.22	0.13	-0.13	0.71	1.00

Female Sample (N = 900)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) SES	1.00										
(2) Math/Sci Achievement	0.05	1.00									
(3) Social Achievement	0.15	0.01	1.00								
(4) College Type	0.19	0.35	0.06	1.00							
(5) College Minority Suppt.	-0.08	-0.05	0.09	0.13	1.00						
(6) Science Ambition	-0.10	0.11	0.06	-0.03	0.36	1.00					
(7) College Science Grades	0.04	0.36	-0.02	-0.09	0.11	0.10	1.00				
(8) Family Values	-0.04	-0.03	-0.08	-0.07	0.07	0.03	0.02	1.00			
(9) Service	-0.05	0.10	0.22	0.16	0.31	0.12	0.03	0.02	1.00		
(10) Commitment	-0.00	0.21	0.03	0.00	0.55	0.75	0.20	0.12	-0.01	1.00	
(11) Outcome	0.02	0.17	-0.00	0.04	0.39	0.55	0.27	0.05	-0.05	0.77	1.00

Science ambition, which we found to be related to gender in some unexplained way, is affected by math/science achievement in high school more for males than for females. This finding may suggest that males, more than females, are likely to commit themselves to a career based on their talents and achievements. Females may recognize that they have math/science skills and abilities, but may not feel that those skills and abilities could or should turn into a career. Another interpretation is that the statements themselves may sound overly ambitious, even arrogant, to some people. If females more than males see making a contribution to basic scientific theory as something that is beyond the dreams of most scientists, they may indicate that such an outstanding achievement is not what they expect to accomplish themselves. They may still, however, plan to be good scientists. These speculations, of course, require more research.

For the female sample, family values are affected by very little in the model. The importance of a family does appear to affect commitment to MSE very slightly, and in the positive direction (contrary to the hypothesis based on interview data).

Commitment to MSE is affected by college MSE grades more for males than for females. This finding is consistent with the finding discussed above showing, for females, less of a relationship between high school math/science achievement and the desire to do science.

Finally, in the prediction of student status in 1990 (outcome), the type of college attended has less effect on outcome for males than for females (path coefficient is 0.32 for males and only 0.09 for females). Commitment to MSE during the sophomore year, especially for females, is almost a guarantee that they will still be in MSE three years later (path coefficient for females is 0.85).

Most of the differences in the models for males and females are quite small. They are pointed out here because, for the variables mentioned, the factor loadings for males and females differ by two or more standard errors. In some ways, however, the path to success does appear to be slightly different for men and women.

Males who are able to enter four-year colleges and universities appear to have greater access to, and need for, minority support systems, especially more advanced students who serve as role models and advisors. Those support systems appear to encourage interest in MSE and promote greater science ambitions. Those with higher ambitions are more likely to make a commitment to MSE as a career. Males making a commitment in their sophomore year are likely to remain in MSE for at least the next three years.

For females, it appears to be less important whether they enter a two-year or four-year college. But for both genders, enjoying MSE and making a commitment to an MSE career by the end of the sophomore year almost ensures that the students of both genders will still be in MSE three years later.

POLICY IMPLICATIONS

An enthusiasm for science and engineering either builds or diminishes during the first two years of college. The availability of a minority support system appears to be an important part of the process of building this enthusiasm, especially for males. Males in two-year colleges are less likely to persist in MSE than are males in four-year colleges. The model indicates that this occurs for at least two reasons, one being that students with weaker academic skills are more likely to attend two-year colleges, and the other being that students in two-year colleges lack contact with more advanced students of their ethnic group who can serve as role models and advisors.

There may be many ways that two-year colleges can strengthen their minority support systems. It appears from the data that for males, it is important to have the advice and support of advanced students of the same ethnic group as well as a dedicated minority relations staff. Perhaps a linkage with a nearby four-year college or university in which minority students could develop personal ties with more advanced students would be productive.

Another advantage of a linkage with a larger institution would be to strengthen students' visions of their educational and professional goals. It can be difficult to envision a personal goal, such as being a scientist or engineer, without first envisioning what it is to be a junior or senior. Perhaps each step of the educational process--not just the goal--should be clearly visible to the student. Those stepping stones to success, namely the junior and senior years, as well as graduate school years, should be in sight for every student. To know the goal without the path, and to see no other minorities on the path ahead, could be discouraging.

A relatively small negative effect on persistence appears to be participation in various types of clubs and organizations. This explains, at least in part, why a smaller proportion of women than men persist -- greater proportions of women than men participate in social activities. One might suspect that there are several factors that may account for this effect. MSE fields are academically demanding, and a student has only so much time to devote to studies and extracurricular activities. Although we do not want to perpetuate the stereotype of the lone scientist, awkward and unsocialized, it is important to impress upon minority students that a commitment to studies will pay off in a satisfying career. Social events not only occupy time that could be devoted to MSE studies, but they can serve as distractions from a goal. The balance between being "well rounded" and developing an area of expertise can be difficult to achieve. Perhaps MSE students could be made more aware of the fact that maintaining this balance throughout life is necessary and not easy.

Related to interests in clubs and organizations is student concern about performing a service to society or the community. Not all students have a desire to serve or have social or political ambitions. But it is unfortunate that for some people the desire to perform a service is in conflict with being a scientist or engineer. Other research, mentioned earlier, confirms that many students leave MSE so that they can do something to benefit society. It is a sad commentary on science and engineering that they cannot be perceived as capable of benefitting society. Science and engineering need the efforts of the academic community to change their image--a negative image having been largely constructed by the media. Science and engineering departments could take responsibility for improving the image of their professions by pointing out the improvements in medicine, transportation, and creature comforts that have arisen from technology and from our understanding of nature, rather than allowing the media to emphasize the destructive forces of bombs and air pollution. Students do not have to leave MSE to perform a service.

Finally, this model did not emphasize sufficiently the importance of math/science skills because the sample was drawn from students who scored relatively highly on the SAT mathematics test. We would expect the model to show that math/science achievement in high school has very large effects on persistence if the entire population of test takers were studied. Even in this select sample, high-school math/science achievement and college grades had an impact on persistence. While we focus on the various environmental and motivational factors influencing student persistence, it is important not to forget that academic preparation and high quality college course work are essential for minority student success in science and engineering.

RESEARCH IMPLICATIONS

In sorting through the maze of variables affecting minority MSE students, several mysteries have arisen. Valuable insights may be gained by researching these questions:

- What is it about minority support systems that motivate students to enjoy science and engineering and to make a career commitment to an MSE field?

By examining the components of minority support systems in different colleges and universities, we could determine which components make the greatest contribution to minority persistence in MSE. Correlations among variables in the model suggest that minority support actually increases the student's enjoyment of MSE coursework as well as their decision to make a career commitment. Minority support does not appear to have a direct effect on grades, which suggests that it is not a tutorial component that is operating. Rather, its effects are on the affective quality of MSE studies, perhaps increasing confidence or stressing the importance of study or commitment, or simply the enjoyment of making scientific discoveries. Just what these components are could be learned through more in-depth studies.

- Why does commitment to MSE during the sophomore year almost ensure success through graduation?

Research into the nature of the relationship between sophomore commitment and later persistence could lead us to understand whether it is the act of making a commitment that keeps the student on target, or whether there is something about completing the first two years of coursework successfully that gives the student encouragement to complete the last two years. It may be the nature of the curriculum that contributes to this commitment, with many of the most difficult courses, such as organic chemistry, being taught in the sophomore year. Once over the big hurdle, so to speak, students may feel confident that they can complete the rest. Whatever the reasons, the dynamics of this commitment and later persistence could be better understood, and that understanding may provide important information for curriculum developers.

- Why are minority role models and advisors more important for males than females?

The model indicates that male MSE students appear to need minority support more than female MSE students do. This finding should be confirmed with other data in other contexts to see if it is universally true and to see if the model is being interpreted correctly. If so, the exact dynamics of the relationships between students and minority role models and advisors should be researched.

Perhaps the minority support system works differently for women and perhaps it should be structured differently so as to increase minority female participation in MSE.

- Are attitudes and enjoyment really more important than achievement?

Which is more important to success--attitude or achievement? This is an age-old question, but in the context of minority and female success in MSE, it is an important question. The data in this model seem to suggest that enjoyment of science is far more important for persistence than grades. This conclusion probably applies to high-ability students and not to a general population of high school seniors planning to be scientists or engineers. Recall that the sample was selected from the population of SAT takers earning mathematics scores of 550 or higher. The assumption underlying the sample selection was that anyone scoring over 550 has the academic ability to succeed in science or engineering provided they have the motivation and educational support. The purpose of the study was primarily to explore the effectiveness of various educational and social support systems. No doubt, if the same survey had been conducted on all high school students planning to study MSE, grades and test scores would have played a far greater role in predicting persistence.

This type of analytical model should be tested on different types of student populations to determine how much of our energy and resources should be put into improving cognitive skills and performance in coursework and how much should be directed towards motivational components of minority support programs.

- Why should the type of college attended (two-year or four-year) affect the persistence of males and not females?

It is understandable that two-year colleges lack the minority support offered by more advanced MSE students and that they accept students with more questionable academic records, but it is not clear at all what other effects it has on student persistence. We have no basis for understanding why the persistence rate of females is unaffected by whether they are in two-year or four-year colleges.

First, this finding should be tested on other samples to see if it is true in general. Then, second, if it is true in general, a study should be done in greater depth to see whether there are truly institutional effects or whether some other set of variables (covariates) are operating.

- Why do females have less science ambition than males, even when they have the same levels of achievement?

Findings from this study indicate that even when males and females have the same levels of math/science achievement, females have less ambition to make scientific discoveries and contributions than males do. Do female MSE students have lower aspirations than males? Do they receive less encouragement from professors than males do? Are females less likely than males to associate academic success in a field with choosing a career in that field? Do females entering MSE professions see themselves perhaps as working in a laboratory but not personally making a scientific discovery or contribution? A more detailed study comparing the attitudes and expectations of male and female MSE students may reveal very different views of what it means to be a scientist or engineer, and some commonly held perception on the part of female students may prevent some from achieving all they are capable of achieving.

- Can coursework be more enjoyable?

It has not always been the goal of educators to make coursework enjoyable. Findings from this study indicate, however, that minority MSE students who enjoy their studies are likely to make an MSE career commitment and successfully complete their studies. To increase the numbers of minority students who persist in MSE, it follows that a reasonable approach would be to improve their enjoyment of their courses. The data suggest that minority support systems, in some way, are successfully helping students to do just that. Further research should be conducted to learn what components of the minority support systems are actually increasing enjoyment of coursework. These components, if identified and understood, could perhaps be implemented in other MSE departments to increase minority participation and success.

RECOMMENDATIONS

Like most research, this study raises many questions that can be pursued with further research, and its findings point in a number of directions that policy makers can explore. Unlike some research, many of the results have implications that can be acted upon immediately by heads of intervention programs and their sponsors, high school and college counselors, and students themselves. The following practical recommendations arise directly from this study. They consist of actions that can be taken by secondary schools and higher-education institutions with very little change to their current practices.

High School Level

- Urge students who have science and engineering aspirations to participate in science clubs and organizations.
- Encourage science and engineering students to apply to four-year colleges and universities.
- Stress the importance of earning high grades in mathematics and science so that they will be admitted to four-year colleges and universities.
- Point out to students, especially males and those from low SES backgrounds, that others like themselves have succeeded in science and engineering; provide role models when possible.
- Provide information to students illustrating ways in which science and engineering serve society; take care not to emphasize problems created by technology over and above the benefits provided by technology.

- Inform students that the first two years of science and engineering coursework in college may be the most difficult, and that if they can complete their sophomore year successfully, they are likely to be able to complete their bachelor's degree.
- Alert students that some courses may be extremely difficult and discouraging, but that most subsequent courses will be less demanding and more enjoyable.
- Encourage minority students, especially males and students from lower SES backgrounds, to attend colleges where minority support systems and role models are available.
- Inform math/science teachers that their encouragement of high-ability minority students has a long-term effect on student persistence in MSE.
- Introduce minority students to minority scientists, engineers, physicians, and other professional/technical role models.

College Level

- Encourage minority students, especially males and those from lower SES backgrounds, to avail themselves of minority support services.
- Provide opportunities for incoming freshmen to establish relationships with advanced students of their ethnic group and to meet with minority advisors.
- Emphasize that freshman and sophomore courses may be very difficult and that students who succeed in science and engineering are committed to hard work and earning high grades.
- Encourage participation in math/science courses that strengthen basic skills.
- Stress the variety of careers in math, science, and engineering so that students who may lose interest in one area can shift to another MSE area in which they can utilize their scientific abilities.

- Emphasize the social and humanitarian benefits of science and technology, especially to students who plan to switch majors because the sciences do not appear to meet the need to serve society.
- Provide linkages between two-year and four-year institutions so that students in two-year colleges can envision their course of study beyond the sophomore year and form relationships with more advanced students.

REFERENCES

Grandy, J. (1992). *Graduate enrollment decisions of undergraduate science and engineering majors: A survey of GRE test takers* (GRE Board Professional Report No. 85-01). Princeton, NJ: Educational Testing Service.

Hilton, T. L., Hsia, J., Solorzano, D. G., & Burton, N. L. (1989). *Persistence in science of high-ability minority students* (ETS Research Report RR-89-28). Princeton, NJ: Educational Testing Service.

Hilton, T. L., Hsia, J., Cheng, M. T., Miller, J. D. (1994). *Persistence in science of high-ability minority students, phase IV: Second follow-up.* Final report to the National Science Foundation, Grant No. MDR-8955092. Princeton, NJ: Educational Testing Service.

Jöreskog, K. G., & Sörbom, D. (1988). *PRELIS--A program for multivariate data screening and data summarization. A preprocessor for LISREL.* Second Edition. Chicago: Scientific Software, Inc.

Jöreskog, K. G., & Sörbom, D. (1993). *LISREL 8: Structural equation modeling with the SIMPLIS command language.* Chicago: Scientific Software, Inc.

Jöreskog, K. G., & Sörbom, D. (1993). *New features in PRELIS 2.* Chicago: Scientific Software, Inc.

Sax, L. J. (1994). Retaining tomorrow's scientists: Exploring the factors that keep male and female college students interested in science careers. *Journal of Women and Minorities in Science and Engineering, 1*, 45-61.

Werts, C. E., Rock, D. A., Linn, R. L., & Jöreskog, K. G. (1976). A comparison of correlations, variances, covariances and regression weights with or without measurement errors. *Psychological Bulletin, 83*, 1007-1013.

Werts, C. E., Rock, D. A., Linn, R. L., & Jöreskog, K. G. (1977). Validating psychometric assumptions within and between populations. *Educational and Psychological Measurement, 37*, 863-871.

APPENDIXES

APPENDIX A: Correlation between Each Measured Variable and Outcome in 1990

APPENDIX B: Complete Correlation Matrix of All Measured Variables

APPENDIX C: LISREL Computer Output for Best-Fitting Model

APPENDIX D: LISREL Solution for Male Sample

APPENDIX E: LISREL Solution for Female Sample

APPENDIX A

Correlation between Each Measured Variable and Outcome in 1990

Appendix A
Correlation between Each Measured Variable and Outcome in 1990
(N = 2,410)

Variable	Definition of Variable	r
SEX	As specified on SAT registration form (1=male, 2=female)	-.16
SATV	SAT verbal score	-.05
SATM	SAT mathematical score	.15
TSWE	Test of Standard Written English score	-.10
GPA	Self reported high school grade point average	.09
RANK	Self reported class rank	.11
ENGLGRD	Self reported latest grade in English	.03
MATHGRD	Self reported latest grade in mathematics	.13
LANGGRD	Self reported latest grade in foreign language	.03
BIOGRD	Self reported latest grade in biological sciences	.09
PHYSGRD	Self reported latest grade in physical sciences	.15
SOCGRD	Self reported latest grade in social studies	.02
HENGL	Honors course in English (yes or no)	.03
HMATH	Honors course in mathematics (yes or no)	.12
HLANG	Honors course in foreign language (yes or no)	.04
HBIOL	Honors course in biological sciences (yes or no)	.05
HPHYS	Honors course in physical sciences (yes or no)	.07
HSOC	Honors course in social studies (yes or no)	.04
ADVENG	Advanced placement course in English	-.05
ADVMATH	Advanced placement course in math	.12
ADVLANG	Advanced placement course in a language	.02
ADVBIOL	Advanced placement course in biological sciences	.02
ADVPHYS	Advanced placement course in physical sciences	.11
ADVSOC	Advanced placement course in social studies	-.05
ADVARTM	Advanced placement course in art or music	-.04
NADVSCI	Number of advanced science courses	.11
NADVNSCI	Number of advanced non-science courses	-.03

NADVTOT	Total number of advanced courses	.04
HRSWORK	Hours per week worked	-.09
COMMSERV	Level of participation and leadership in community or church	.01
ATHLETIC	Level of participation in athletics	.03
CLUBS	Level of participation and leadership in clubs and organizations	-.03
AWARDS	Number of honors and awards received	.06
ASPIR	Highest level of education planned	.01
ETHNIC	Ethnic category (not scaled)	.--
FATHEDUC	Highest level of father's education	.01
MOTHEDUC	Highest level of mother's education	.06
INCOME	Approximate family income	-.01
ATHPART	Participated in athletics (yes or no)	.02
ETHPART	Participated in ethnic activities or organizations	-.01
JOURN	Participated in journalism, debating, or dramatics	-.11
ARTMUSIC	Participated in art, music, or dancing	-.10
DEPTCLUB	Participated in departmental or professional club	.07
RELIG	Participated in religious activities or organizations	.03
SOCCLUB	Participated in social clubs or community organizations	-.02
STUDGOVT	Participated in student government	-.02
ACTABIL	Self rating of acting ability	-.07
ARTABIL	Self rating of artistic ability	.02
ATHLABIL	Self rating of athletic ability	.04
CWRITABL	Self rating of creative writing ability	-.07
OTHRABIL	Self rating of ability to get along with others	-.04
LEADABIL	Self rating of leadership ability	-.03
MATHABIL	Self rating of mathematical ability	.17
MECHABIL	Self rating of mechanical ability	.13
MUSABIL	Self rating of musical ability	-.03
ORGABIL	Self rating of ability to organize work	.02
SALEABIL	Self rating of sales ability	-.03
SCIABIL	Self rating of scientific ability	.14
SPEAKABL	Self rating of ability in spoken expression	-.06

WRITABIL	Self rating of ability in written expression	-.05
MVDIF	Difference between SAT mathematical and verbal test score	.15
IA	Participation in honors mathematics courses in high school	.11
IB	Perceived influence of participation in honors science courses in high school	.08
IC	Perceived influence of participation in A.P. mathematics	.07
ID	Perceived influence of participation in A.P. sciences	.03
IE	Perceived influence of participation in magnet school	.06
IF	Perceived influence of participation in career fairs	.06
IG	Perceived influence of participation in museum/ university MSE project	.02
IH	Perceived influence of participation in science fair/independent research project	.06
II	Perceived influence of participation in minority professional recruitment program	.06
IJ	Perceived influence of participation in college based minority MSE recruitment/enrichment program	.07
IK	Perceived influence of participation in female MSE recruitment/enrichment program	-.01
IL	Perceived influence of participation in science/math clubs	.08
IM	Perceived influence of participation in industry sponsored MSE program	.09
IIA	Perceived influence of mother/female guardian	.10
IIB	Perceived influence of father/male guardian	.12
IIC	Perceived influence of sister/brother	.06
IID	Perceived influence of other family member	.01
IIE	Perceived influence of family or personal friends	.03
IIF	Perceived influence of science/math teacher(s)	.12
IIG	Perceived influence of teacher(s) in other subject(s)	-.02
IIH	Perceived influence of high school counselor	.06
III	Perceived influence of high school coach	.04
IIJ	Perceived influence of principal/administrator(s)	.04
IIK	Perceived influence of extracurricular math/science project staff	.04
IIL	Perceived influence of mentor for independent math/science project	.02
IIM	Perceived influence of math/science classmates	.06
IIN	Perceived influence of other high school friends	-.00
IIO	Motivated my own interests in MSE	.27
IIP	Perceived influence of college recruiters	.09

IIQ	Perceived influence of minority scientists, engineers, M.D.	.13
IIR	Perceived influence of women scientists, engineers, M.D.	.05
IIS	Perceived influence of men scientists, engineers, M.D.	.13
IIT	Perceived influence of business/industry representatives	.05
IIU	Perceived influence of church or community advisor	.05
IIV	Perceived influence of scientist/engineer/physicians at summer or part-time jobs	.10
IIW	Perceived influence of supervisor(s) at jobs	.04
IIX	Perceived influence of scientists in news, media	.13
NPGMS	Total number of influential programs (IA to IIM)	-.01
NPEOPLE	Total number of influential people (IIA to IIX)	-.02
COLTYPE	Type of college attended, 2-year or 4-year/university	.16
Q12A	Satisfaction with ability, knowledge, personal qualities of most instructors	-.03
Q12B	Satisfaction with social life on campus	-.02
Q12C	Satisfaction with development of my work skills	.04
Q12D	Satisfaction with my intellectual growth	.04
Q12E	Satisfaction with counseling or job placement	.02
Q12F	Satisfaction with buildings, library, equipment	-.05
Q12G	Satisfaction with cultural activities, music, art, etc.	-.09
Q12H	Satisfaction with intellectual life of the school	-.05
Q12I	Satisfaction with course curriculum	.01
Q12J	Satisfaction with quality of instruction	-.05
Q12K	Satisfaction with sports and recreation facilities	-.06
Q12L	Satisfaction with financial cost of attending	.03
Q12M	Satisfaction with prestige of the school	.01
Q12N	Satisfaction with MSE course offerings	.28
Q12O	Satisfaction with racial/ethnic/gender climate	.08
COLGPA	Overall college grade point average	.18
MSEGPA	Grade average in MSE courses	.28
Q19A	Participation in a bridge, or transitional, MSE program between high school and college	.19
Q19B	Participation in college science/math courses that strengthened my basic skills	.28
Q19C	Participation in tutoring in math/science	.14

Q19D	Participation in a course in communications skills for science and technology	.13
Q19E	Participation in a course for study skills or problem solving	.11
Q19F	Access to and use of computers	.18
Q19G	Intrinsic interest of my courses in MSE	.64
Q19H	Advice and support from advanced students from my ethnic group	.32
Q19I	Knowledge, ability, and teaching skills of my MSE instructors	.54
Q19J	Hands-on experience in laboratories	.38
Q19K	Teamwork with my classmates	.37
Q19L	Minority and/or female role models and advisors	.20
Q19M	My intellectual growth in college	.43
Q19N	Adequate financial aid	.15
Q19O	MSE related work opportunities	.38
Q19P	Professional career/academic counselling	.18
Q19Q	Dedicated minority relations staff	.16
Q19R	My enjoyment of my chosen major field	.65
Q19S	Found an MSE field to which I can make a commitment	.69
Q21A	Importance of being successful in my own line of work	.09
Q21B	Importance of finding the right person to marry and having a happy family life	.06
Q21C	Importance of having a lot of money	.03
Q21D	Importance of having strong friendships	-.01
Q21E	Importance of being able to find steady work	.11
Q21F	Importance of being a leader in my community	.04
Q21G	Importance of being able to give my children better opportunities than I've had	.10
Q21H	Importance of living close to parents and relatives	.08
Q21I	Importance of getting away from this area of the country	-.03
Q21J	Importance of working to correct social and economic inequalities	.02
Q21K	Importance of having children	.01
Q21L	Importance of having leisure time to enjoy my own interests	.01
Q21M	Importance of making practical scientific or technological contributions	.50
Q21N	Importance of contributing to basic science theory	.42
Q21O	Importance of creating something beautiful and lasting	.05
Q21P	Importance of being an inspiring teacher or role model	-.00

Q21Q	Importance of discovering new frontiers in science and technology	.49
Q21R	Importance of serving the public interest	-.01
Q21S	Importance of being respected in my field	.06
Q22A	Importance of previous work in the area to the kind of work planned for rest of life	.10
Q22B	Importance of good income to start or within a few years	.12
Q22C	Importance of job security and permanence	.20
Q22D	Importance of work that is important and interesting	.07
Q22E	Importance of freedom to make own decisions	-.03
Q22F	Importance of meeting and working with sociable friendly people	-.02
MSE90	1990 outcome (0=not in MSE, 1=In MSE)	1.00

APPENDIX B

Complete Correlation Matrix of All Measured Variables

This matrix contains all variables that were used in building and testing models. Only a small subset was used in the best-fitting model reported. Descriptions of all variables and the reasons for their inclusion or exclusion from the model are available from the author.

CORRELATION MATRIX

	SEX	SATV	SATM	TSWE	GPA	RANK
SEX	1.000					
SATV	0.121	1.000				
SATM	-0.183	0.415	1.000			
TSWE	0.286	0.634	0.302	1.000		
GPA	0.170	0.269	0.226	0.269	1.000	
RANK	0.120	0.303	0.284	0.294	0.673	1.000
ENGLGRD	0.249	0.297	0.133	0.302	0.811	0.581
MATHGRD	0.031	0.120	0.258	0.140	0.769	0.522
LANGGRD	0.263	0.259	0.174	0.311	0.716	0.601
BIOGRD	0.148	0.292	0.201	0.249	0.688	0.607
PHYSGRD	0.043	0.223	0.304	0.178	0.730	0.565
SOCGRD	0.112	0.309	0.174	0.248	0.764	0.602
HENGL	0.196	0.272	0.148	0.270	0.235	0.375
HMATH	0.103	0.191	0.230	0.163	0.187	0.363
HLANG	0.138	0.169	0.104	0.194	0.115	0.157
HBIOL	0.144	0.208	0.094	0.165	0.157	0.251
HPHYS	0.118	0.161	0.157	0.112	0.149	0.297
HSOC	0.112	0.208	0.136	0.179	0.132	0.282
ADVENG	0.174	0.307	0.107	0.291	0.254	0.326
ADVMATH	-0.041	0.026	0.243	-0.024	0.162	0.243
ADVLANG	0.149	0.158	0.110	0.131	0.157	0.187
ADVBIOL	0.123	0.228	0.148	0.172	0.151	0.180
ADVPHYS	-0.092	0.159	0.252	0.040	0.120	0.159
ADVSOC	0.041	0.235	0.159	0.163	0.158	0.213
ADVARTM	0.015	0.120	0.051	0.094	-0.021	-0.014
NADVSCI	-0.019	0.143	0.262	0.051	0.168	0.238
NADVNSCI	0.154	0.294	0.146	0.252	0.237	0.294
NADVTOT	0.082	0.250	0.237	0.168	0.227	0.307
HRSWORK	-0.118	-0.045	0.011	-0.019	-0.034	-0.066
COMMSERV	0.202	0.043	-0.058	0.077	0.093	0.068
ATHLETIC	-0.285	-0.086	0.024	-0.076	-0.045	-0.036
CLUBS	0.228	0.172	0.080	0.164	0.292	0.361
AWARDS	0.189	0.230	0.166	0.246	0.439	0.513
ASPIR	0.160	0.183	0.090	0.135	0.151	0.160
ETHNIC	-0.099	0.047	0.147	-0.008	0.192	0.110
FATHEDUC	0.065	0.226	0.174	0.112	0.043	0.005
MOTHEDUC	0.139	0.194	0.102	0.124	-0.024	-0.037
INCOME	0.043	0.240	0.165	0.160	0.005	-0.008
ATHPART	-0.344	-0.061	0.064	-0.057	-0.049	-0.071
ETHPART	0.146	0.036	0.043	0.045	0.024	-0.034
JOURN	0.216	0.322	0.101	0.265	0.190	0.185
ARTMUSIC	0.382	0.202	0.064	0.207	0.085	0.056
DEPTCLUB	0.049	0.066	0.067	0.065	0.180	0.160
RELIG	0.203	0.091	0.027	0.120	0.147	0.103
SOCCLUB	0.253	0.139	0.056	0.130	0.169	0.184
STUDGOVT	0.168	0.131	0.006	0.147	0.188	0.245
ACTABIL	0.001	0.130	0.074	0.110	0.043	0.047
ARTABIL	-0.051	0.110	0.090	0.072	0.040	0.019
ATHLABIL	-0.375	-0.118	0.051	-0.133	-0.063	-0.075
CWRITABL	0.064	0.311	0.137	0.266	0.203	0.224
OTHRABIL	0.129	-0.004	-0.066	0.063	0.050	0.052
LEADABIL	0.062	0.076	0.017	0.086	0.183	0.215
MATHABIL	-0.093	0.000	0.354	0.011	0.341	0.375
MECHABIL	-0.360	0.012	0.131	-0.084	-0.002	-0.017
MUSABIL	0.164	0.149	0.093	0.149	0.043	0.037
ORGABIL	0.222	0.124	0.069	0.139	0.306	0.294
SALEABIL	0.055	-0.003	0.007	0.003	0.058	0.040
SCIABIL	-0.106	0.274	0.266	0.137	0.337	0.356
SPEAKABL	0.133	0.239	0.065	0.218	0.176	0.170
WRITABIL	0.147	0.319	0.115	0.324	0.285	0.288
MVDIF	-0.247	-0.818	0.176	-0.495	-0.145	-0.149

IA	0.010	-0.035	0.137	-0.027	0.095	0.159
IB	0.043	0.073	0.085	0.032	0.065	0.111
IC	-0.040	-0.043	0.146	-0.057	-0.011	0.016
ID	-0.010	0.056	0.120	0.001	-0.022	-0.020
IE	-0.002	-0.020	-0.069	-0.053	-0.153	-0.215
IF	0.077	-0.044	-0.065	-0.026	0.009	0.028
IG	-0.019	0.010	-0.007	-0.036	-0.056	-0.017
IH	0.013	0.044	0.005	0.018	0.028	0.041
II	-0.012	-0.051	-0.034	-0.025	-0.074	-0.066
IJ	0.008	0.000	-0.035	0.026	-0.009	0.036
IK	0.083	0.044	0.014	0.041	-0.068	-0.043
IL	0.025	-0.016	0.078	-0.009	0.105	0.143
IM	-0.102	-0.048	-0.017	-0.044	-0.080	-0.051
IIA	0.084	-0.037	-0.062	-0.057	0.007	0.004
IIB	-0.042	0.049	0.064	0.011	0.066	0.073
IIC	-0.059	-0.066	-0.005	-0.075	0.049	0.040
IID	0.076	-0.105	-0.076	-0.057	-0.017	-0.005
IIE	-0.014	-0.041	-0.014	-0.026	0.042	0.042
IIF	0.070	-0.047	0.020	-0.007	0.121	0.154
IIG	0.085	0.004	-0.053	0.022	0.088	0.132
IIH	0.003	-0.075	-0.046	-0.001	0.046	0.089
III	-0.282	-0.095	0.025	-0.113	-0.014	-0.031
IIJ	-0.044	0.003	0.033	0.037	0.066	0.114
IIK	-0.034	-0.068	0.026	-0.053	0.012	0.016
IIL	0.003	-0.049	-0.053	-0.037	-0.005	-0.020
IIM	-0.030	-0.039	0.028	-0.017	0.058	0.076
IIN	-0.025	-0.026	0.007	-0.018	0.027	0.015
IIO	0.054	-0.002	0.037	0.041	0.140	0.174
IIP	0.052	-0.059	-0.041	0.014	0.012	0.035
IIQ	0.174	-0.046	-0.103	0.053	0.031	0.031
IIR	0.504	0.044	-0.082	0.137	0.077	0.036
IIS	0.067	0.016	-0.019	0.052	0.070	0.060
IIT	-0.030	-0.077	-0.047	-0.039	-0.041	-0.027
IIU	0.039	-0.067	-0.108	-0.016	-0.006	-0.006
IIV	0.021	0.032	0.005	0.021	0.068	0.041
IIW	0.021	-0.020	-0.012	0.004	0.007	0.016
IIX	-0.032	0.128	0.050	0.066	0.109	0.110
NPGMS	0.180	0.046	0.033	0.069	0.010	0.007
NPEOPLE	-0.010	0.002	0.028	0.029	-0.006	0.011
COLTYPE	0.080	0.268	0.174	0.185	0.299	0.175
Q12A	0.058	0.073	0.030	0.094	0.117	0.123
Q12B	-0.017	0.054	0.064	0.075	0.045	0.051
Q12C	0.042	-0.040	-0.034	0.011	0.086	0.085
Q12D	0.017	0.012	0.009	0.067	0.130	0.131
Q12E	0.099	-0.035	-0.022	0.035	0.093	0.082
Q12F	0.077	0.058	0.042	0.086	0.139	0.131
Q12G	0.137	0.140	0.079	0.141	0.103	0.092
Q12H	0.072	0.085	0.085	0.131	0.171	0.183
Q12I	0.015	0.049	0.097	0.088	0.124	0.130
Q12J	0.053	0.053	0.026	0.096	0.125	0.131
Q12K	-0.056	0.027	0.056	0.058	0.111	0.105
Q12L	-0.118	-0.092	-0.035	-0.111	-0.047	-0.075
Q12M	0.062	0.089	0.091	0.116	0.183	0.183
Q12N	-0.022	-0.042	0.097	0.007	0.126	0.133
Q12O	-0.116	-0.073	0.025	-0.073	0.006	-0.039
COLGPA	0.118	0.220	0.197	0.168	0.380	0.355
MSEGPA	0.002	0.038	0.190	0.019	0.271	0.257
Q19A	-0.015	-0.134	-0.038	-0.110	-0.017	-0.037
Q19B	0.002	-0.139	0.019	-0.065	0.049	0.044
Q19C	0.093	-0.098	-0.106	-0.053	-0.033	-0.032
Q19D	-0.134	-0.157	-0.051	-0.147	-0.042	-0.040
Q19E	-0.073	-0.165	-0.127	-0.160	-0.051	-0.083
Q19F	-0.125	-0.023	0.068	-0.032	0.006	-0.018
Q19G	-0.136	-0.047	0.143	-0.043	0.159	0.126

Q19H	0.048	-0.121	-0.070	-0.066	0.033	0.038
Q19I	-0.013	-0.037	0.060	-0.006	0.131	0.127
Q19J	-0.049	0.030	0.078	0.033	0.064	0.101
Q19K	-0.068	-0.023	0.027	0.017	0.090	0.072
Q19L	0.131	-0.120	-0.086	-0.046	0.005	0.001
Q19M	0.033	-0.032	0.033	0.055	0.109	0.135
Q19N	0.019	-0.035	-0.003	0.022	0.141	0.159
Q19O	-0.085	-0.006	0.073	-0.032	0.142	0.098
Q19P	0.077	-0.041	-0.074	-0.029	0.088	0.057
Q19Q	0.018	-0.111	-0.048	-0.043	0.003	0.025
Q19R	-0.051	-0.155	0.058	-0.115	0.095	0.080
Q19S	-0.173	-0.110	0.091	-0.083	0.080	0.089
Q21A	0.016	-0.088	-0.059	-0.042	-0.025	0.019
Q21B	-0.141	-0.078	0.037	-0.049	-0.003	0.014
Q21C	-0.188	-0.130	-0.037	-0.131	-0.115	-0.115
Q21D	-0.017	0.063	0.077	0.070	0.010	-0.018
Q21E	0.026	-0.179	-0.084	-0.100	-0.017	-0.016
Q21F	-0.035	-0.113	-0.097	-0.069	0.077	0.088
Q21G	-0.119	-0.242	-0.182	-0.190	-0.053	-0.040
Q21H	-0.004	-0.107	0.002	-0.047	0.041	0.039
Q21I	0.005	-0.019	-0.068	-0.004	-0.039	-0.046
Q21J	0.189	0.031	-0.082	0.042	0.069	0.088
Q21K	-0.013	-0.112	-0.024	-0.059	-0.007	-0.031
Q21L	-0.006	0.016	0.050	0.029	-0.036	-0.042
Q21M	-0.137	-0.053	0.044	-0.066	0.090	0.103
Q21N	-0.158	-0.089	0.039	-0.081	0.060	0.048
Q21O	0.010	-0.074	-0.050	-0.029	-0.005	0.007
Q21P	0.123	-0.072	-0.056	0.048	0.059	0.057
Q21Q	-0.170	-0.062	0.044	-0.078	0.073	0.070
Q21R	0.068	-0.004	-0.054	0.048	0.114	0.128
Q21S	0.075	-0.156	-0.095	-0.074	0.031	0.051
Q22A	0.060	-0.086	-0.077	-0.041	0.006	-0.023
Q22B	-0.096	-0.206	-0.102	-0.143	-0.083	-0.065
Q22C	-0.043	-0.276	-0.132	-0.150	-0.049	-0.031
Q22D	0.211	0.084	0.033	0.135	0.079	0.096
Q22E	-0.003	0.022	0.012	0.003	0.034	0.005
Q22F	0.093	-0.123	-0.069	-0.022	-0.006	0.021
MSE90	-0.162	-0.050	0.147	-0.095	0.092	0.113

CORRELATION MATRIX

	ENGLGRD	MATHGRD	LANGGRD	BIOGRD	PHYSGRD	SOCGRD
ENGLGRD	1.000					
MATHGRD	0.442	1.000				
LANGGRD	0.536	0.450	1.000			
BIOGRD	0.577	0.429	0.512	1.000		
PHYSGRD	0.503	0.543	0.470	0.549	1.000	
SOCGRD	0.604	0.433	0.490	0.564	0.491	1.000
HENGL	0.176	0.122	0.292	0.281	0.216	0.245
HMATH	0.145	0.102	0.239	0.190	0.201	0.173
HLANG	0.107	0.044	0.179	0.079	0.105	0.071
HBIOL	0.140	0.106	0.125	0.083	0.128	0.158
HPHYS	0.114	0.118	0.184	0.139	0.120	0.122
HSOC	0.164	0.059	0.207	0.196	0.161	-0.020
ADVENG	0.299	0.108	0.294	0.261	0.174	0.240
ADVMATH	0.084	0.214	0.112	0.152	0.192	0.069
ADVLANG	0.150	0.062	0.280	0.150	0.086	0.120
ADVBIOL	0.180	0.040	0.112	0.222	0.122	0.162
ADVPHYS	0.067	0.086	0.065	0.075	0.196	0.092
ADVSOC	0.222	0.063	0.155	0.165	0.105	0.087
ADVARTM	0.105	-0.039	-0.063	0.038	-0.048	-0.034
NADVSCI	0.116	0.152	0.113	0.169	0.208	0.116
NADVNSCI	0.284	0.095	0.289	0.241	0.151	0.188
NADVTOT	0.226	0.138	0.231	0.237	0.205	0.172

HRSWORK	-0.053	-0.023	-0.040	-0.003	-0.010	-0.024
COMMSERV	0.129	0.062	0.048	0.115	0.050	0.066
ATHLETIC	-0.062	-0.013	-0.122	-0.032	-0.029	-0.034
CLUBS	0.271	0.204	0.270	0.300	0.251	0.259
AWARDS	0.410	0.326	0.392	0.417	0.371	0.364
ASPIR	0.153	0.067	0.148	0.174	0.108	0.095
ETHNIC	0.137	0.114	0.195	0.188	0.164	0.184
FATHEDUC	0.025	0.012	0.032	0.054	0.037	0.062
MOTHEDUC	-0.027	-0.030	-0.041	0.044	-0.003	-0.036
INCOME	0.009	-0.058	-0.019	0.044	-0.009	0.060
ATHPART	-0.067	-0.013	-0.153	-0.017	-0.067	-0.032
ETHPART	0.002	0.042	0.012	0.050	0.007	0.015
JOURN	0.254	0.096	0.150	0.226	0.137	0.157
ARTMUSIC	0.128	0.000	0.144	0.119	0.036	0.039
DEPTCLUB	0.104	0.147	0.152	0.143	0.203	0.178
RELIG	0.195	0.073	0.094	0.181	0.075	0.115
SOCCLUB	0.146	0.109	0.136	0.141	0.119	0.170
STUDGOVT	0.189	0.155	0.148	0.179	0.153	0.171
ACTABIL	0.056	-0.007	0.048	0.076	0.033	0.051
ARTABIL	0.036	-0.013	0.044	0.108	0.043	0.049
ATHLABIL	-0.104	-0.008	-0.119	-0.066	-0.011	-0.051
CWRITABL	0.316	0.028	0.194	0.195	0.145	0.205
OTHRABIL	0.059	0.012	0.059	0.044	0.040	0.053
LEADABIL	0.187	0.126	0.125	0.158	0.156	0.166
MATHABIL	0.172	0.515	0.244	0.161	0.355	0.171
MECHABIL	-0.086	0.076	-0.081	-0.007	0.076	-0.027
MUSABIL	0.075	-0.027	0.092	0.065	0.049	0.007
ORGABIL	0.315	0.222	0.251	0.258	0.251	0.262
SALEABIL	0.053	0.029	0.016	0.053	0.080	0.043
SCIABIL	0.248	0.278	0.223	0.341	0.452	0.257
SPEAKABL	0.215	0.066	0.161	0.177	0.141	0.175
WRITABIL	0.398	0.099	0.275	0.249	0.194	0.256
MVDIF	-0.234	0.032	-0.168	-0.193	-0.051	-0.227
IA	0.034	0.144	0.115	0.031	0.104	0.021
IB	0.032	0.042	0.093	0.068	0.107	0.018
IC	-0.054	0.055	-0.014	-0.048	0.010	-0.057
ID	-0.026	-0.047	-0.025	-0.030	0.000	-0.018
IE	-0.119	-0.093	-0.187	-0.154	-0.129	-0.163
IF	0.018	0.010	0.007	0.011	-0.008	0.011
IG	-0.044	-0.040	-0.059	-0.038	-0.033	-0.068
IH	0.054	0.003	0.020	0.043	0.028	0.048
II	-0.085	-0.067	-0.083	-0.021	-0.036	-0.069
IJ	0.004	-0.010	-0.030	-0.007	-0.027	0.002
IK	-0.052	-0.047	-0.068	-0.103	-0.059	-0.037
IL	0.086	0.109	0.106	0.105	0.111	0.082
IM	-0.088	-0.066	-0.067	-0.080	-0.048	-0.039
IIA	0.005	0.032	-0.005	0.005	-0.007	0.017
IIB	0.053	0.067	0.047	0.079	0.027	0.082
IIC	0.068	0.020	0.038	0.035	0.038	0.053
IID	-0.036	0.003	0.020	-0.028	-0.037	-0.032
IIE	0.021	0.052	0.041	0.003	0.041	0.029
IIF	0.076	0.137	0.098	0.072	0.122	0.067
IIG	0.129	0.036	0.114	0.059	0.046	0.072
IIH	0.054	0.040	0.041	0.012	0.031	0.033
III	-0.025	-0.001	-0.063	-0.040	-0.020	0.024
IIJ	0.052	0.072	0.033	0.055	0.095	0.027
IIK	0.031	0.010	-0.006	0.005	0.041	-0.025
IIL	-0.018	-0.018	-0.004	-0.023	0.025	-0.009
IIM	0.031	0.056	0.059	0.018	0.055	0.036
IIN	0.064	0.006	0.017	0.026	-0.002	0.012
IIO	0.122	0.090	0.167	0.111	0.175	0.066
IIP	0.017	-0.001	0.037	0.006	-0.015	-0.004
IIQ	0.050	-0.023	0.091	0.009	-0.013	0.000
IIR	0.113	-0.001	0.141	0.058	-0.002	0.023

IIS	0.070	0.038	0.110	0.032	0.033	0.026
IIT	-0.009	-0.048	-0.024	-0.050	-0.064	-0.041
IIU	0.039	0.001	-0.037	-0.015	-0.028	-0.045
IIV	0.079	0.034	0.061	0.062	0.060	0.061
IIW	0.033	-0.002	0.040	-0.031	-0.002	0.013
IIX	0.104	0.057	0.092	0.101	0.080	0.106
NPGMS	0.012	0.049	0.029	-0.023	-0.006	0.005
NPEOPLE	0.006	0.004	-0.066	0.004	0.009	0.012
COLTYPE	0.224	0.247	0.247	0.224	0.241	0.242
Q12A	0.144	0.062	0.142	0.137	0.081	0.085
Q12B	0.077	0.008	0.065	0.041	0.030	0.048
Q12C	0.079	0.094	0.076	0.041	0.067	0.046
Q12D	0.142	0.122	0.093	0.085	0.109	0.086
Q12E	0.123	0.070	0.086	0.091	0.043	0.044
Q12F	0.132	0.126	0.133	0.149	0.102	0.116
Q12G	0.127	0.036	0.119	0.113	0.064	0.094
Q12H	0.183	0.126	0.152	0.164	0.108	0.153
Q12I	0.138	0.110	0.109	0.128	0.065	0.082
Q12J	0.148	0.093	0.137	0.136	0.070	0.089
Q12K	0.106	0.094	0.086	0.099	0.083	0.095
Q12L	-0.045	-0.029	-0.058	-0.047	-0.060	-0.014
Q12M	0.191	0.136	0.154	0.171	0.146	0.131
Q12N	0.115	0.120	0.118	0.109	0.102	0.060
Q12O	-0.004	0.003	0.013	-0.027	0.017	0.012
COLGPA	0.345	0.297	0.343	0.342	0.340	0.330
MSEGPA	0.192	0.278	0.243	0.224	0.281	0.176
Q19A	-0.043	0.031	-0.028	-0.045	-0.030	-0.045
Q19B	0.047	0.080	0.114	0.054	0.027	-0.064
Q19C	-0.020	-0.026	-0.017	-0.050	-0.068	-0.041
Q19D	-0.075	0.031	-0.045	-0.022	-0.020	-0.063
Q19E	-0.034	-0.012	-0.051	-0.060	-0.068	-0.077
Q19F	-0.025	0.077	-0.047	-0.026	0.047	-0.029
Q19G	0.077	0.216	0.136	0.101	0.192	0.022
Q19H	0.040	0.052	0.042	0.038	0.026	-0.034
Q19I	0.111	0.131	0.101	0.086	0.142	0.050
Q19J	0.072	0.030	0.048	0.077	0.094	0.058
Q19K	0.109	0.067	0.080	0.077	0.041	0.084
Q19L	0.014	0.000	0.038	-0.018	0.016	-0.017
Q19M	0.115	0.121	0.101	0.084	0.093	0.057
Q19N	0.129	0.133	0.157	0.113	0.148	0.074
Q19O	0.102	0.153	0.119	0.086	0.139	0.082
Q19P	0.103	0.062	0.072	0.063	0.047	0.035
Q19Q	-0.013	0.000	0.033	0.001	0.016	-0.024
Q19R	0.042	0.123	0.083	0.121	0.147	-0.022
Q19S	-0.007	0.135	0.041	0.110	0.163	-0.007
Q21A	-0.021	-0.042	0.026	-0.034	0.001	-0.039
Q21B	0.010	0.006	-0.047	0.021	-0.015	0.040
Q21C	-0.169	-0.029	-0.095	-0.099	-0.059	-0.141
Q21D	0.037	-0.012	0.007	0.005	-0.050	0.005
Q21E	-0.060	0.047	0.013	-0.069	-0.055	-0.052
Q21F	0.064	0.053	0.073	0.034	0.079	0.073
Q21G	-0.067	-0.033	-0.007	-0.036	-0.056	-0.021
Q21H	0.049	0.011	0.059	0.037	0.028	0.043
Q21I	-0.050	-0.046	-0.026	0.017	-0.053	-0.032
Q21J	0.134	0.005	0.081	0.085	0.006	0.059
Q21K	-0.011	0.010	-0.022	0.013	-0.012	0.004
Q21L	-0.031	-0.014	-0.041	-0.004	-0.015	-0.044
Q21M	0.079	0.087	0.083	0.095	0.128	0.009
Q21N	0.054	0.059	0.046	0.046	0.114	-0.024
Q21O	0.027	-0.040	0.040	0.032	-0.014	-0.025
Q21P	0.104	-0.007	0.059	0.035	0.058	0.062
Q21Q	0.061	0.060	0.072	0.080	0.117	-0.007
Q21R	0.158	0.068	0.076	0.103	0.100	0.076
Q21S	0.013	0.068	0.007	0.009	0.019	0.009

Q22A	0.014	-0.001	0.030	0.046	0.012	-0.033
Q22B	-0.104	-0.023	-0.044	-0.093	-0.084	-0.100
Q22C	-0.063	-0.007	-0.022	-0.078	-0.053	-0.063
Q22D	0.158	0.000	0.103	0.060	0.045	0.059
Q22E	0.049	-0.005	0.063	0.032	0.039	0.028
Q22F	0.004	-0.022	0.051	0.026	-0.016	0.003
MSE90	0.026	0.130	0.032	0.092	0.152	0.022

CORRELATION MATRIX

	HENGL	HMATH	HLANG	HBIOL	HPHYS	HSOC
HENGL	1.000					
HMATH	0.733	1.000				
HLANG	0.490	0.607	1.000			
HBIOL	0.672	0.684	0.584	1.000		
HPHYS	0.666	0.777	0.573	0.781	1.000	
HSOC	0.746	0.612	0.537	0.643	0.641	1.000
ADVENG	0.541	0.312	0.218	0.299	0.274	0.376
ADVMATH	0.192	0.414	0.103	0.151	0.232	0.139
ADVLANG	0.121	0.194	0.506	0.117	0.188	0.107
ADVBIOL	0.164	0.171	0.176	0.384	0.230	0.187
ADVPHYS	0.188	0.262	0.161	0.232	0.377	0.181
ADVSOC	0.262	0.243	0.206	0.205	0.224	0.553
ADVARTM	0.044	0.114	0.085	0.106	0.094	0.104
NADVSCI	0.216	0.360	0.167	0.285	0.332	0.196
NADVNSCI	0.406	0.310	0.374	0.265	0.281	0.426
NADVTOT	0.367	0.393	0.320	0.320	0.360	0.372
HRSWORK	-0.026	0.024	-0.030	-0.019	-0.008	-0.021
COMMSERV	0.087	0.080	0.066	0.113	0.113	0.055
ATHLETIC	-0.113	-0.027	-0.033	-0.061	-0.082	-0.114
CLUBS	0.258	0.186	0.117	0.149	0.161	0.162
AWARDS	0.289	0.267	0.158	0.196	0.217	0.218
ASPIR	0.153	0.133	0.106	0.138	0.123	0.135
ETHNIC	0.007	0.014	0.062	-0.006	-0.015	-0.002
FATHEDUC	0.019	0.076	0.118	0.079	0.090	0.013
MOTHEDUC	0.015	0.060	0.101	0.076	0.088	0.036
INCOME	0.010	0.036	0.076	0.033	0.034	0.038
ATHPART	-0.153	-0.010	-0.067	-0.056	-0.070	-0.110
ETHPART	0.063	0.129	0.177	0.039	0.093	0.111
JOURN	0.182	0.118	0.134	0.147	0.117	0.167
ARTMUSIC	0.094	0.110	0.147	0.116	0.076	0.090
DEPTCLUB	0.195	0.172	0.102	0.166	0.199	0.114
RELIG	0.046	0.049	0.031	0.083	0.115	0.025
SOCCLUB	0.159	0.146	0.139	0.174	0.164	0.153
STUDGOVT	0.216	0.146	0.086	0.159	0.169	0.146
ACTABIL	0.104	0.087	0.096	0.121	0.131	0.093
ARTABIL	0.042	0.096	0.094	0.078	0.087	0.061
ATHLABIL	-0.089	0.020	-0.019	-0.018	-0.004	-0.074
CWRITABL	0.189	0.146	0.106	0.154	0.117	0.139
OTHRABIL	0.026	0.053	0.070	0.061	0.053	0.037
LEADABIL	0.141	0.148	0.080	0.130	0.132	0.115
MATHABIL	0.103	0.289	0.069	0.112	0.157	0.081
MECHABIL	-0.034	0.055	0.000	0.034	0.009	0.000
MUSABIL	0.053	0.056	0.101	0.082	0.056	0.086
ORGABIL	0.155	0.181	0.153	0.168	0.152	0.150
SALEABIL	0.044	0.069	0.088	0.047	0.045	0.025
SCIABIL	0.173	0.219	0.144	0.229	0.218	0.153
SPEAKABL	0.158	0.125	0.097	0.175	0.158	0.109
WRITABIL	0.225	0.162	0.155	0.163	0.139	0.146
MVDIF	-0.200	-0.057	-0.120	-0.166	-0.071	-0.140
IA	0.256	0.427	0.240	0.239	0.314	0.213
IB	0.275	0.337	0.299	0.397	0.458	0.304
IC	0.095	0.232	0.160	0.107	0.160	0.124
ID	0.114	0.181	0.189	0.211	0.240	0.173

IE	-0.018	0.025	0.080	0.046	0.053	-0.044
IF	0.073	0.041	0.027	0.108	0.077	0.065
IG	0.038	0.051	-0.005	0.055	0.064	0.070
IH	0.094	0.092	0.042	0.123	0.103	0.051
II	-0.014	0.002	0.020	0.059	0.064	-0.003
IJ	0.054	0.086	-0.007	0.065	0.091	0.033
IK	-0.037	0.026	0.012	0.017	0.034	-0.069
IL	0.118	0.140	0.084	0.134	0.127	0.089
IM	0.021	0.044	-0.019	0.042	0.087	0.012
IIA	-0.011	-0.016	0.028	0.048	0.070	0.030
IIB	-0.047	0.009	-0.002	-0.020	0.008	0.026
IIC	0.018	0.038	-0.015	0.008	0.050	0.048
IID	0.000	-0.002	0.035	-0.015	-0.002	-0.015
IIE	0.026	0.030	0.024	0.044	0.045	0.045
IIF	0.082	0.121	0.035	0.029	0.093	0.095
IIG	0.082	0.033	0.036	0.031	0.057	0.101
IIH	0.060	0.045	0.036	0.053	0.062	0.071
III	-0.097	-0.014	-0.067	-0.088	-0.060	-0.106
IIJ	0.040	0.045	0.036	0.004	0.043	-0.010
IIK	0.049	0.084	0.035	0.046	0.103	0.019
IIL	-0.028	0.016	0.037	0.033	0.044	-0.078
IIM	0.073	0.080	0.005	0.036	0.077	0.052
IIN	0.027	0.026	-0.004	-0.026	0.032	0.053
IIO	0.072	0.113	0.062	0.056	-0.004	0.041
IIP	0.021	0.038	0.034	0.057	0.077	0.004
IIQ	0.082	0.043	0.089	0.092	0.134	0.059
IIR	0.069	0.052	0.087	0.080	0.133	0.032
IIS	0.018	0.059	0.040	0.056	0.096	0.056
IIT	-0.030	0.006	-0.003	-0.033	0.031	-0.004
IIU	0.020	0.012	0.026	0.026	0.054	0.035
IIV	0.041	0.105	0.090	0.078	0.099	0.034
IIW	0.033	0.077	0.029	0.024	0.057	0.042
IIX	0.036	0.049	0.025	0.069	0.054	0.014
NPGMS	0.052	0.015	0.037	0.033	0.029	0.009
NPEOPLE	0.041	-0.007	-0.015	-0.010	-0.021	-0.002
COLTYPE	0.210	0.123	0.229	0.143	0.143	0.144
Q12A	0.071	0.059	0.018	0.033	0.035	0.048
Q12B	-0.010	0.029	0.037	0.017	0.026	0.020
Q12C	-0.006	0.041	0.043	-0.011	0.005	-0.001
Q12D	0.024	0.055	0.031	0.008	0.031	-0.003
Q12E	0.006	-0.013	-0.007	-0.017	0.001	0.036
Q12F	0.076	0.067	0.068	0.034	0.054	0.057
Q12G	0.087	0.096	0.119	0.048	0.079	0.093
Q12H	0.117	0.143	0.138	0.132	0.138	0.104
Q12I	0.042	0.063	0.022	0.024	0.061	0.024
Q12J	0.072	0.108	0.037	0.022	0.043	0.032
Q12K	0.011	0.072	0.051	-0.009	0.045	-0.019
Q12L	-0.105	-0.090	-0.120	-0.066	-0.082	-0.088
Q12M	0.143	0.168	0.146	0.123	0.127	0.120
Q12N	0.031	0.089	0.067	0.075	0.061	0.056
Q12O	-0.115	-0.027	-0.073	-0.027	-0.080	-0.077
COLGPA	0.101	0.138	0.067	0.066	0.076	0.070
MSEGPA	0.028	0.120	-0.018	0.020	0.040	-0.016
Q19A	0.010	0.004	0.019	0.005	0.018	0.019
Q19B	0.029	0.068	0.044	0.066	0.040	0.067
Q19C	0.003	-0.012	0.010	-0.008	0.021	-0.003
Q19D	-0.055	-0.024	-0.069	-0.053	0.002	-0.063
Q19E	-0.039	-0.027	-0.033	-0.006	-0.039	-0.019
Q19F	0.000	0.057	0.015	0.000	0.019	-0.016
Q19G	0.013	0.123	0.052	0.078	0.033	0.000
Q19H	0.085	0.073	0.033	0.125	0.094	0.094
Q19I	0.065	0.146	0.077	0.140	0.095	0.066
Q19J	0.109	0.081	0.071	0.081	0.094	0.039
Q19K	0.045	0.043	0.016	0.041	0.013	0.034

```
        Q19L      0.072      0.076     -0.013      0.076      0.091      0.076
        Q19M      0.092      0.069      0.115      0.094      0.100      0.066
        Q19N      0.080      0.060     -0.010     -0.012      0.089      0.019
        Q19O     -0.014      0.087      0.036      0.022      0.040     -0.012
        Q19P      0.055      0.036      0.024      0.001      0.063      0.041
        Q19Q      0.023      0.021     -0.010      0.012      0.044      0.054
        Q19R     -0.017      0.121      0.039      0.029      0.002      0.046
        Q19S      0.000      0.121      0.000      0.031      0.029      0.030
        Q21A     -0.037      0.050     -0.029      0.031     -0.014      0.001
        Q21B     -0.018      0.009     -0.017     -0.012     -0.037     -0.020
        Q21C     -0.056     -0.035     -0.027     -0.013      0.008      0.017
        Q21D     -0.002      0.037      0.063      0.060      0.022      0.012
        Q21E     -0.013      0.014      0.021      0.009      0.047      0.008
        Q21F      0.006      0.075      0.047      0.035      0.060      0.030
        Q21G     -0.019      0.006     -0.025     -0.031      0.026     -0.001
        Q21H     -0.040     -0.018     -0.026     -0.029     -0.022     -0.023
        Q21I     -0.015      0.012     -0.007     -0.020      0.002      0.001
        Q21J      0.099      0.075      0.073      0.112      0.114      0.037
        Q21K     -0.025      0.010     -0.018     -0.020     -0.015     -0.013
        Q21L      0.002     -0.004      0.000      0.021     -0.008     -0.011
        Q21M      0.013      0.055      0.005      0.040      0.025      0.018
        Q21N     -0.028      0.015     -0.005     -0.006     -0.018     -0.009
        Q21O     -0.023     -0.002      0.035     -0.010     -0.013     -0.016
        Q21P      0.059      0.031      0.044      0.028      0.022      0.048
        Q21Q     -0.001      0.062      0.012      0.025      0.044      0.028
        Q21R      0.065      0.021      0.070      0.061      0.065      0.078
        Q21S      0.007      0.013     -0.001     -0.001      0.031      0.013
        Q22A     -0.002      0.003      0.042      0.030      0.022      0.021
        Q22B     -0.002      0.011     -0.054     -0.032      0.003      0.024
        Q22C     -0.036     -0.010     -0.017      0.016      0.036     -0.002
        Q22D      0.173      0.112      0.002      0.087      0.143      0.079
        Q22E      0.027      0.043      0.048      0.039      0.046     -0.001
        Q22F      0.004     -0.004      0.013     -0.031     -0.014     -0.014
       MSE90      0.034      0.116      0.040      0.049      0.072      0.037

            CORRELATION MATRIX
                 ADVENG    ADVMATH    ADVLANG    ADVBIOL    ADVPHYS     ADVSOC

                ________   ________   ________   ________   ________   ________
      ADVENG      1.000
     ADVMATH      0.304      1.000
     ADVLANG      0.205      0.210      1.000
     ADVBIOL      0.273      0.140      0.160      1.000
     ADVPHYS      0.256      0.480      0.167      0.290      1.000
      ADVSOC      0.492      0.208      0.187      0.312      0.257      1.000
     ADVARTM      0.135      0.147      0.248      0.276      0.221      0.289
     NADVSCI      0.332      0.927      0.211      0.789      0.944      0.301
    NADVNSCI      0.907      0.303      0.794      0.313      0.285      0.882
     NADVTOT      0.777      0.774      0.623      0.650      0.751      0.736
     HRSWORK     -0.022     -0.024     -0.053      0.023     -0.038      0.007
    COMMSERV      0.130      0.058      0.003      0.073      0.073      0.100
    ATHLETIC     -0.086      0.044     -0.019     -0.027      0.045     -0.021
       CLUBS      0.289      0.130      0.129      0.161      0.082      0.187
      AWARDS      0.331      0.194      0.176      0.156      0.148      0.243
       ASPIR      0.194      0.051      0.140      0.281      0.122      0.168
      ETHNIC     -0.020      0.039      0.150     -0.012      0.028     -0.008
    FATHEDUC      0.056      0.058      0.135      0.163      0.157      0.062
    MOTHEDUC      0.025      0.001      0.055      0.112      0.126      0.048
      INCOME      0.050     -0.025      0.070      0.144      0.097      0.038
     ATHPART     -0.103      0.055     -0.020      0.023      0.038      0.044
     ETHPART      0.113      0.050      0.092      0.057      0.156      0.172
       JOURN      0.222      0.102      0.179      0.190      0.102      0.255
    ARTMUSIC      0.134      0.058      0.054      0.128      0.054      0.141
    DEPTCLUB      0.111      0.140      0.110      0.114      0.104      0.032
       RELIG      0.116      0.067      0.093      0.077      0.059      0.075
```

SOCCLUB	0.188	0.098	0.171	0.158	0.160	0.162
STUDGOVT	0.202	0.099	0.029	0.132	0.046	0.105
ACTABIL	0.140	0.065	0.099	0.095	0.108	0.124
ARTABIL	0.075	0.088	0.129	0.165	0.101	0.087
ATHLABIL	-0.037	0.083	-0.044	-0.028	0.076	-0.013
CWRITABL	0.309	0.075	0.129	0.162	0.105	0.173
OTHRABIL	0.068	0.049	0.105	0.084	0.010	0.046
LEADABIL	0.173	0.139	0.096	0.115	0.105	0.118
MATHABIL	0.064	0.404	0.068	0.002	0.154	0.057
MECHABIL	-0.021	0.115	0.020	-0.001	0.177	0.027
MUSABIL	0.135	0.035	0.054	0.106	0.056	0.100
ORGABIL	0.179	0.152	0.150	0.128	0.087	0.190
SALEABIL	0.074	0.086	0.084	0.068	0.058	0.118
SCIABIL	0.175	0.190	0.155	0.293	0.343	0.199
SPEAKABL	0.219	0.084	0.159	0.187	0.146	0.176
WRITABIL	0.309	0.089	0.171	0.175	0.113	0.178
MVDIF	-0.263	0.128	-0.106	-0.160	-0.004	-0.157
IA	0.112	0.354	0.112	-0.005	0.158	0.110
IB	0.141	0.117	0.103	0.263	0.304	0.162
IC	0.077	0.420	0.073	0.045	0.209	0.152
ID	0.096	0.174	0.069	0.368	0.394	0.183
IE	-0.015	0.034	-0.046	0.058	0.086	-0.012
IF	0.020	0.004	-0.008	-0.021	0.035	-0.007
IG	0.019	0.041	-0.060	0.063	0.114	0.017
IH	0.048	0.026	-0.022	0.072	0.098	0.007
II	-0.005	0.059	0.002	-0.079	0.029	-0.019
IJ	-0.016	0.046	-0.032	-0.011	0.004	-0.029
IK	-0.017	0.009	0.011	0.039	-0.005	-0.029
IL	0.055	0.145	0.068	0.095	0.089	0.043
IM	-0.032	0.042	-0.025	-0.035	0.056	-0.015
IIA	0.031	0.021	0.066	0.136	0.019	0.061
IIB	0.009	0.055	0.067	0.114	0.063	0.046
IIC	0.044	0.083	-0.020	0.012	0.016	0.047
IID	0.015	0.066	0.047	0.014	-0.030	-0.037
IIE	0.006	0.078	0.000	0.047	0.057	-0.005
IIF	0.033	0.140	0.052	0.029	0.065	0.039
IIG	0.106	0.023	0.036	0.070	-0.009	0.087
IIH	0.037	-0.012	0.006	-0.044	-0.034	0.017
III	-0.091	0.042	-0.063	-0.037	-0.030	-0.065
IIJ	0.036	0.049	-0.023	0.033	0.030	-0.009
IIK	0.026	0.111	0.019	-0.015	0.070	-0.018
IIL	0.015	0.066	-0.050	0.060	0.080	0.005
IIM	0.003	0.110	0.019	0.027	0.045	0.011
IIN	0.011	0.044	-0.050	0.037	0.010	0.023
IIO	0.080	0.079	0.034	0.079	0.071	0.071
IIP	0.036	0.034	-0.045	-0.077	0.006	-0.010
IIQ	0.065	0.030	0.043	0.028	0.044	0.036
IIR	0.131	0.036	0.114	0.079	0.042	0.065
IIS	0.088	0.078	0.111	0.082	0.102	0.066
IIT	0.012	0.024	-0.013	-0.113	-0.010	0.013
IIU	0.021	-0.022	-0.012	-0.018	-0.002	-0.013
IIV	0.081	0.063	0.106	0.095	0.100	0.062
IIW	0.064	0.026	0.034	-0.021	0.042	0.039
IIX	0.099	0.051	0.075	0.171	0.081	0.074
NPGMS	0.064	-0.004	0.055	0.115	0.021	-0.010
NPEOPLE	0.029	0.013	-0.016	0.010	-0.038	0.018
COLTYPE	0.181	0.019	0.192	0.162	0.163	0.102
Q12A	0.046	0.053	0.062	0.082	0.031	0.006
Q12B	0.020	-0.013	0.051	-0.029	-0.021	0.061
Q12C	0.007	0.004	0.062	-0.013	0.001	0.016
Q12D	0.007	0.027	0.010	-0.014	0.012	-0.042
Q12E	0.011	-0.024	0.013	-0.050	0.036	-0.027
Q12F	0.046	0.062	0.088	0.055	-0.022	0.054
Q12G	0.065	0.028	0.074	0.033	-0.007	0.099

Q12H	0.114	0.073	0.115	0.067	0.042	0.085
Q12I	0.016	0.045	0.086	0.041	0.086	0.011
Q12J	0.027	0.050	0.067	0.059	0.042	0.004
Q12K	0.036	0.072	0.043	-0.047	-0.001	0.011
Q12L	-0.106	-0.065	-0.103	-0.058	-0.067	-0.071
Q12M	0.112	0.099	0.105	0.013	0.049	0.099
Q12N	-0.003	0.065	0.015	0.034	0.068	-0.018
Q12O	-0.075	-0.001	-0.001	-0.041	-0.035	-0.036
COLGPA	0.134	0.112	0.112	0.151	0.085	0.078
MSEGPA	0.045	0.188	0.053	0.047	0.108	0.020
Q19A	-0.030	0.045	-0.018	-0.067	0.059	-0.056
Q19B	-0.022	0.137	0.027	0.034	0.115	0.007
Q19C	0.014	-0.027	0.007	-0.030	-0.030	-0.007
Q19D	-0.075	0.018	-0.083	-0.014	0.037	-0.049
Q19E	-0.063	-0.037	-0.093	-0.031	0.029	-0.016
Q19F	0.001	0.150	-0.125	0.016	0.089	-0.054
Q19G	-0.023	0.135	-0.011	0.059	0.118	-0.052
Q19H	0.074	0.057	-0.050	0.001	0.061	-0.017
Q19I	0.060	0.101	-0.014	0.147	0.121	-0.015
Q19J	0.054	0.092	0.038	0.135	0.141	-0.007
Q19K	0.043	0.060	-0.036	0.065	0.059	-0.064
Q19L	-0.012	0.015	0.011	-0.009	0.026	-0.048
Q19M	0.072	0.146	0.026	0.136	0.061	-0.014
Q19N	0.091	0.029	-0.004	-0.061	0.023	-0.041
Q19O	-0.005	0.076	-0.054	0.075	0.146	-0.002
Q19P	0.071	0.063	-0.031	-0.016	-0.009	0.009
Q19Q	-0.025	-0.004	-0.051	-0.016	0.024	-0.014
Q19R	-0.081	0.097	0.021	0.052	0.100	0.002
Q19S	-0.065	0.151	0.001	0.005	0.115	-0.012
Q21A	-0.008	-0.016	0.115	0.035	-0.030	0.063
Q21B	-0.014	0.019	0.050	-0.014	0.003	-0.024
Q21C	-0.076	-0.007	-0.064	-0.085	0.035	0.034
Q21D	0.000	-0.002	0.035	-0.005	0.018	0.010
Q21E	-0.072	0.000	-0.050	-0.066	-0.004	-0.060
Q21F	0.035	0.033	0.063	0.003	0.041	0.052
Q21G	-0.028	0.031	0.033	-0.038	0.017	-0.101
Q21H	-0.008	0.041	0.014	0.053	-0.039	0.007
Q21I	-0.019	-0.012	-0.020	0.038	-0.068	-0.029
Q21J	0.059	0.004	0.066	0.103	0.006	0.022
Q21K	-0.057	0.010	0.052	-0.026	-0.060	-0.055
Q21L	-0.008	0.054	0.005	0.024	0.059	-0.010
Q21M	0.000	0.113	0.040	0.068	0.137	-0.040
Q21N	-0.005	0.083	0.019	0.051	0.106	-0.019
Q21O	-0.026	0.024	0.105	0.068	-0.012	0.032
Q21P	0.034	0.003	0.036	-0.013	-0.037	0.004
Q21Q	0.027	0.113	0.041	0.094	0.163	0.012
Q21R	0.089	-0.001	0.066	0.090	0.011	0.081
Q21S	-0.021	0.048	0.079	0.038	-0.001	-0.042
Q22A	-0.028	0.029	0.034	0.044	0.064	-0.014
Q22B	-0.042	0.036	-0.106	-0.061	0.040	-0.042
Q22C	-0.070	0.045	-0.055	-0.097	0.002	-0.106
Q22D	0.157	-0.024	0.103	0.075	0.014	-0.014
Q22E	0.055	0.077	0.122	0.082	0.028	0.051
Q22F	-0.003	0.022	0.062	0.037	-0.011	-0.088
MSE90	-0.049	0.125	0.025	0.018	0.110	-0.053

CORRELATION MATRIX

	ADVARTM	NADVSCI	NADVNSCI	NADVTOT	HRSWORK	COMMSERV
ADVARTM	1.000					
NADVSCI	0.247	1.000				
NADVNSCI	0.666	0.358	1.000			
NADVTOT	0.547	0.874	0.886	1.000		
HRSWORK	-0.025	-0.021	-0.026	-0.028	1.000	

COMMSERV	0.183	0.078	0.110	0.112	-0.017	1.000
ATHLETIC	0.090	0.030	-0.050	-0.006	0.037	0.027
CLUBS	0.102	0.144	0.256	0.230	0.014	0.319
AWARDS	0.182	0.200	0.321	0.300	-0.028	0.235
ASPIR	0.040	0.152	0.205	0.207	-0.015	0.048
ETHNIC	-0.054	0.027	0.043	0.038	0.013	-0.166
FATHEDUC	0.057	0.137	0.100	0.138	0.010	0.048
MOTHEDUC	0.127	0.084	0.056	0.085	-0.009	0.141
INCOME	-0.004	0.068	0.063	0.077	0.000	0.019
ATHPART	0.047	0.047	-0.043	0.008	0.052	0.050
ETHPART	0.073	0.106	0.152	0.154	0.043	0.214
JOURN	0.115	0.148	0.266	0.233	0.033	0.232
ARTMUSIC	0.509	0.089	0.171	0.150	-0.038	0.243
DEPTCLUB	-0.016	0.144	0.106	0.146	0.005	0.142
RELIG	0.075	0.077	0.120	0.115	0.038	0.546
SOCCLUB	0.040	0.158	0.212	0.215	0.027	0.354
STUDGOVT	0.097	0.106	0.149	0.145	0.035	0.226
ACTABIL	0.233	0.104	0.163	0.155	0.056	0.179
ARTABIL	0.302	0.133	0.136	0.152	0.023	0.006
ATHLABIL	0.039	0.062	-0.034	0.025	0.074	-0.015
CWRITABL	0.125	0.124	0.266	0.225	0.018	0.129
OTHRABIL	0.112	0.054	0.096	0.091	0.054	0.207
LEADABIL	0.179	0.147	0.171	0.185	0.053	0.273
MATHABIL	-0.084	0.265	0.066	0.193	0.001	0.030
MECHABIL	0.105	0.127	0.013	0.084	0.074	-0.012
MUSABIL	0.511	0.071	0.164	0.137	-0.006	0.219
ORGABIL	0.129	0.146	0.212	0.208	0.035	0.185
SALEABIL	0.092	0.085	0.109	0.115	0.149	0.164
SCIABIL	0.081	0.313	0.211	0.305	0.009	0.087
SPEAKABL	0.261	0.156	0.239	0.231	0.023	0.221
WRITABIL	0.130	0.138	0.282	0.244	-0.002	0.162
MVDIF	-0.102	0.017	-0.228	-0.119	0.060	-0.085
IA	-0.024	0.239	0.131	0.220	0.024	0.028
IB	-0.045	0.258	0.156	0.244	-0.011	0.065
IC	-0.005	0.304	0.112	0.251	0.014	-0.018
ID	-0.057	0.358	0.124	0.287	-0.011	0.029
IE	0.054	0.071	-0.024	0.026	-0.043	0.064
IF	0.010	0.010	0.008	0.009	-0.077	0.079
IG	-0.010	0.085	-0.001	0.046	-0.003	0.049
IH	0.025	0.074	0.025	0.056	-0.069	0.115
II	-0.057	0.020	-0.014	0.006	-0.037	0.058
IJ	-0.033	0.025	-0.029	-0.003	-0.025	0.071
IK	-0.036	0.019	-0.019	0.002	0.015	-0.040
IL	-0.045	0.136	0.063	0.117	-0.013	0.082
IM	0.120	0.035	-0.017	0.015	-0.018	0.059
IIA	-0.045	0.058	0.054	0.063	-0.014	0.127
IIB	-0.020	0.087	0.041	0.075	0.013	0.040
IIC	-0.085	0.052	0.020	0.039	-0.009	0.033
IID	0.012	0.026	0.008	0.019	-0.030	0.082
IIE	0.029	0.077	0.003	0.045	-0.019	0.072
IIF	-0.062	0.106	0.037	0.087	-0.003	0.083
IIG	0.080	0.031	0.099	0.077	0.031	0.091
IIH	-0.043	-0.031	0.025	-0.007	-0.025	0.025
III	0.001	-0.002	-0.086	-0.050	0.018	-0.007
IIJ	0.007	0.047	0.005	0.027	-0.023	0.092
IIK	0.045	0.079	0.016	0.057	0.001	0.098
IIL	-0.024	0.082	-0.010	0.038	0.026	0.102
IIM	0.011	0.082	0.016	0.057	-0.002	0.033
IIN	0.077	0.039	0.004	0.024	0.013	0.036
IIO	-0.002	0.088	0.072	0.088	-0.046	0.039
IIP	-0.022	-0.001	-0.004	-0.005	-0.035	0.089
IIQ	0.014	0.042	0.062	0.062	-0.060	0.168
IIR	0.059	0.058	0.134	0.109	-0.081	0.171
IIS	-0.013	0.103	0.104	0.120	-0.035	0.121

IIT	-0.004	-0.023	0.004	-0.011	-0.017	0.125
IIU	0.056	-0.018	0.007	-0.007	-0.057	0.304
IIV	0.077	0.099	0.103	0.118	0.011	0.155
IIW	0.003	0.024	0.056	0.046	0.084	0.104
IIX	0.004	0.107	0.101	0.117	-0.029	0.077
NPGMS	-0.054	0.038	0.040	0.049	0.003	0.003
NPEOPLE	0.030	-0.006	0.020	0.008	0.011	-0.038
COLTYPE	-0.041	0.113	0.188	0.172	-0.114	0.059
Q12A	0.058	0.063	0.050	0.065	0.015	0.010
Q12B	0.008	-0.022	0.045	0.012	0.039	0.034
Q12C	-0.029	-0.001	0.029	0.018	0.031	0.013
Q12D	-0.064	0.016	-0.007	0.008	0.049	0.048
Q12E	-0.102	-0.011	-0.001	-0.008	0.030	0.048
Q12F	0.061	0.039	0.077	0.068	0.036	0.045
Q12G	0.063	0.023	0.094	0.069	0.017	0.070
Q12H	0.017	0.074	0.126	0.119	0.036	0.045
Q12I	0.004	0.068	0.044	0.066	0.001	-0.011
Q12J	0.061	0.058	0.044	0.060	0.038	-0.001
Q12K	-0.012	0.022	0.034	0.030	0.024	0.055
Q12L	-0.080	-0.076	-0.119	-0.115	0.012	-0.070
Q12M	-0.040	0.072	0.120	0.112	-0.025	0.063
Q12N	-0.025	0.069	0.000	0.041	-0.062	-0.001
Q12O	-0.007	-0.026	-0.051	-0.050	-0.013	-0.020
COLGPA	-0.011	0.131	0.132	0.151	0.005	0.059
MSEGPA	-0.035	0.150	0.045	0.114	0.022	0.015
Q19A	-0.032	0.029	-0.038	0.000	-0.008	0.064
Q19B	0.083	0.124	0.008	0.081	0.023	0.006
Q19C	0.050	-0.033	0.010	-0.011	-0.002	0.079
Q19D	-0.015	0.019	-0.088	-0.037	0.021	0.034
Q19E	0.039	-0.016	-0.070	-0.047	0.080	0.047
Q19F	-0.068	0.119	-0.076	0.025	0.028	0.016
Q19G	-0.021	0.130	-0.029	0.060	-0.050	0.014
Q19H	0.147	0.054	0.027	0.049	-0.058	0.138
Q19I	0.099	0.140	0.025	0.095	-0.037	0.050
Q19J	0.146	0.140	0.043	0.105	-0.081	0.033
Q19K	0.100	0.074	-0.004	0.040	0.004	0.086
Q19L	-0.033	0.015	-0.016	-0.004	-0.067	0.093
Q19M	-0.064	0.136	0.037	0.104	-0.059	0.052
Q19N	0.044	0.001	0.038	0.020	-0.006	0.020
Q19O	-0.082	0.116	-0.028	0.052	-0.005	0.032
Q19P	-0.064	0.024	0.023	0.030	-0.041	0.107
Q19Q	0.073	0.002	-0.027	-0.015	-0.006	0.020
Q19R	-0.152	0.103	-0.042	0.036	-0.049	0.043
Q19S	-0.079	0.122	-0.038	0.049	-0.068	0.071
Q21A	0.009	-0.009	0.052	0.031	0.080	0.116
Q21B	-0.011	0.008	0.004	0.009	0.013	0.027
Q21C	-0.036	-0.015	-0.055	-0.034	0.069	-0.056
Q21D	0.043	0.005	0.023	0.021	0.031	0.015
Q21E	-0.131	-0.022	-0.087	-0.062	0.057	-0.010
Q21F	0.032	0.036	0.060	0.058	0.006	0.216
Q21G	-0.079	0.011	-0.038	-0.016	0.020	0.029
Q21H	-0.077	0.021	-0.003	0.014	-0.022	-0.028
Q21I	0.032	-0.019	-0.023	-0.025	0.002	-0.020
Q21J	0.107	0.033	0.068	0.059	-0.060	0.181
Q21K	-0.085	-0.026	-0.034	-0.035	-0.004	0.045
Q21L	0.175	0.057	0.007	0.037	0.000	-0.032
Q21M	-0.005	0.130	0.006	0.077	-0.046	0.046
Q21N	0.020	0.098	0.002	0.057	-0.018	0.009
Q21O	0.121	0.027	0.041	0.039	-0.019	0.022
Q21P	0.061	-0.017	0.041	0.012	0.016	0.143
Q21Q	0.042	0.149	0.038	0.108	-0.035	0.015
Q21R	0.090	0.029	0.103	0.073	0.030	0.158
Q21S	0.055	0.034	0.005	0.026	0.021	0.087
Q22A	0.010	0.054	-0.007	0.027	-0.008	0.065

Q22B	0.007	0.015	-0.076	-0.032	0.017	-0.009
Q22C	-0.117	-0.007	-0.097	-0.061	0.020	0.014
Q22D	0.258	0.014	0.124	0.074	0.015	0.068
Q22E	0.120	0.072	0.092	0.091	0.016	0.042
Q22F	0.047	0.019	-0.005	0.008	0.009	0.047
MSE90	-0.035	0.111	-0.034	0.045	-0.093	0.007

CORRELATION MATRIX

	ATHLETIC	CLUBS	AWARDS	ASPIR	ETHNIC	FATHEDUC
ATHLETIC	1.000					
CLUBS	-0.005	1.000				
AWARDS	-0.058	0.491	1.000			
ASPIR	-0.013	0.125	0.142	1.000		
ETHNIC	-0.074	0.020	0.031	0.007	1.000	
FATHEDUC	0.109	0.053	0.065	0.193	0.037	1.000
MOTHEDUC	0.110	0.041	0.071	0.168	-0.085	0.655
INCOME	0.110	-0.018	0.005	0.115	0.041	0.538
ATHPART	0.885	-0.059	-0.096	0.014	0.005	0.095
ETHPART	0.060	0.177	0.078	0.083	-0.057	0.064
JOURN	-0.081	0.440	0.314	0.168	0.029	0.153
ARTMUSIC	-0.101	0.220	0.264	0.071	0.031	0.157
DEPTCLUB	-0.100	0.224	0.281	0.075	-0.005	0.058
RELIG	0.030	0.199	0.200	0.091	0.016	0.104
SOCCLUB	-0.018	0.393	0.274	0.122	-0.003	0.117
STUDGOVT	0.115	0.657	0.318	0.081	-0.084	0.040
ACTABIL	0.069	0.179	0.187	0.062	-0.007	0.094
ARTABIL	0.038	0.060	0.133	0.032	0.104	0.066
ATHLABIL	0.686	-0.048	-0.087	-0.038	-0.044	0.111
CWRITABL	0.035	0.236	0.247	0.069	0.059	0.141
OTHRABIL	0.133	0.218	0.155	0.048	-0.096	0.067
LEADABIL	0.153	0.449	0.302	0.064	-0.048	0.112
MATHABIL	0.018	0.141	0.230	0.013	0.088	0.031
MECHABIL	0.124	0.000	0.016	-0.067	0.057	0.048
MUSABIL	-0.018	0.144	0.198	0.071	-0.020	0.166
ORGABIL	0.006	0.317	0.323	0.097	0.044	0.122
SALEABIL	0.108	0.189	0.144	0.015	-0.058	0.106
SCIABIL	0.019	0.221	0.297	0.165	0.101	0.177
SPEAKABL	0.073	0.275	0.278	0.109	-0.018	0.137
WRITABIL	-0.027	0.236	0.285	0.111	0.031	0.140
MVDIF	0.107	-0.136	-0.143	-0.139	0.044	-0.128
IA	-0.004	0.080	0.137	0.044	0.003	0.019
IB	-0.054	0.089	0.142	0.116	-0.036	0.066
IC	0.006	-0.017	0.040	0.017	0.015	0.038
ID	-0.010	-0.007	0.025	0.078	-0.002	0.111
IE	0.000	-0.023	-0.032	-0.002	-0.170	-0.003
IF	-0.003	0.110	0.141	-0.033	-0.086	-0.026
IG	-0.018	0.068	0.042	0.020	-0.049	0.042
IH	-0.002	0.125	0.171	0.057	-0.062	0.093
II	0.083	0.017	0.030	-0.088	-0.166	-0.051
IJ	0.058	0.076	0.109	-0.055	-0.203	-0.008
IK	0.021	-0.003	-0.032	-0.047	-0.053	0.054
IL	-0.064	0.216	0.203	0.037	-0.013	-0.022
IM	0.109	0.042	0.042	-0.047	-0.055	0.033
IIA	0.008	0.066	0.070	0.067	-0.077	0.072
IIB	0.021	0.036	0.069	0.047	0.107	0.282
IIC	0.008	0.067	0.018	-0.016	0.040	-0.048
IID	-0.011	0.044	0.035	0.011	-0.063	-0.056
IIE	0.003	0.047	0.039	-0.013	0.015	-0.080
IIF	-0.016	0.095	0.134	0.027	-0.031	-0.151
IIG	-0.052	0.100	0.127	-0.010	-0.052	-0.107
IIH	0.010	0.038	0.078	-0.066	-0.097	-0.189
III	0.537	-0.040	-0.065	-0.035	-0.035	0.025
IIJ	0.127	0.165	0.132	0.017	-0.085	-0.019

IIK	0.002	0.139	0.122	0.040	-0.059	-0.071
IIL	0.044	0.134	0.080	0.034	-0.044	0.058
IIM	-0.027	0.023	0.047	-0.001	0.046	-0.077
IIN	-0.022	0.018	0.021	-0.008	0.029	-0.051
IIO	-0.036	0.094	0.141	0.066	0.040	-0.030
IIP	-0.003	0.055	0.109	-0.036	-0.123	-0.073
IIQ	0.000	0.125	0.160	0.071	-0.175	0.022
IIR	-0.053	0.155	0.148	0.117	-0.119	0.084
IIS	0.016	0.136	0.131	0.086	-0.053	0.104
IIT	0.059	0.058	0.038	-0.088	-0.133	-0.011
IIU	0.023	0.101	0.083	-0.011	-0.176	-0.043
IIV	0.061	0.130	0.133	0.085	-0.050	0.086
IIW	0.042	0.081	0.093	0.017	-0.064	0.008
IIX	-0.047	0.088	0.093	0.097	0.004	0.071
NPGMS	-0.017	0.041	0.003	-0.008	-0.006	0.047
NPEOPLE	-0.020	-0.021	-0.007	0.036	0.002	0.009
COLTYPE	0.105	0.238	0.171	0.100	0.041	0.204
Q12A	-0.024	0.076	0.120	0.062	0.016	0.052
Q12B	0.044	0.050	0.045	-0.015	0.078	0.048
Q12C	0.018	0.015	0.052	0.008	0.076	0.000
Q12D	0.007	0.038	0.089	0.016	0.075	0.036
Q12E	-0.014	0.071	0.068	0.002	-0.008	0.023
Q12F	0.008	0.058	0.085	0.074	0.029	-0.009
Q12G	-0.032	0.119	0.134	0.066	0.020	0.075
Q12H	0.018	0.106	0.129	0.072	0.012	0.039
Q12I	0.039	0.044	0.092	0.076	0.056	0.046
Q12J	0.012	0.058	0.101	0.073	0.048	0.002
Q12K	0.133	0.053	0.072	0.011	0.047	0.016
Q12L	-0.007	-0.064	-0.091	-0.026	0.049	-0.017
Q12M	0.088	0.137	0.170	0.045	-0.051	0.020
Q12N	0.084	-0.007	0.063	0.056	0.040	0.033
Q12O	-0.014	-0.040	-0.014	-0.013	0.200	0.044
COLGPA	-0.083	0.130	0.227	0.132	0.152	0.125
MSEGPA	-0.023	0.033	0.139	0.087	0.098	0.071
Q19A	0.022	0.073	0.034	-0.014	-0.175	-0.059
Q19B	0.054	0.003	-0.032	0.005	0.067	-0.037
Q19C	0.082	0.035	0.001	0.011	-0.100	-0.039
Q19D	0.085	-0.054	-0.016	-0.072	-0.055	-0.056
Q19E	0.085	-0.027	-0.051	-0.048	-0.053	-0.048
Q19F	0.041	-0.034	-0.004	-0.102	0.019	-0.025
Q19G	0.030	0.038	0.067	0.038	-0.013	0.004
Q19H	0.035	0.098	0.098	0.018	-0.168	-0.043
Q19I	0.053	0.042	0.098	0.090	-0.032	0.018
Q19J	0.030	0.074	0.065	0.053	-0.010	0.055
Q19K	0.018	0.063	0.071	0.002	-0.017	0.053
Q19L	0.011	0.100	0.056	-0.002	-0.136	-0.064
Q19M	-0.029	0.078	0.089	0.088	-0.013	0.040
Q19N	-0.018	0.126	0.119	-0.028	-0.024	-0.199
Q19O	0.069	0.057	0.090	0.043	-0.015	0.035
Q19P	-0.011	0.108	0.103	0.011	-0.045	-0.013
Q19Q	0.043	0.026	0.048	-0.023	-0.164	-0.075
Q19R	0.055	-0.032	0.045	0.057	0.007	0.000
Q19S	0.084	-0.006	0.065	0.015	-0.017	-0.010
Q21A	0.025	0.021	0.046	0.066	0.039	-0.014
Q21B	0.059	-0.021	0.006	-0.051	0.108	-0.016
Q21C	0.084	-0.086	-0.070	-0.055	-0.010	0.005
Q21D	0.084	0.012	0.007	0.055	0.086	0.074
Q21E	0.023	-0.068	-0.054	-0.021	-0.041	-0.060
Q21F	0.108	0.169	0.150	0.026	-0.058	-0.043
Q21G	0.043	0.030	0.032	-0.034	-0.077	-0.189
Q21H	0.001	-0.019	-0.010	-0.001	0.047	-0.061
Q21I	0.019	-0.041	-0.006	0.028	-0.061	-0.017
Q21J	-0.027	0.153	0.143	0.101	-0.131	-0.060
Q21K	0.034	0.002	-0.010	-0.021	0.050	-0.024

```
     Q21L     -0.001      -0.023       0.009       0.035      -0.006       0.074
     Q21M     -0.006       0.026       0.106       0.073       0.052      -0.034
     Q21N      0.019      -0.012       0.054       0.072       0.045      -0.034
     Q21O     -0.074       0.044       0.070       0.028       0.061      -0.029
     Q21P      0.046       0.115       0.141       0.025      -0.100      -0.051
     Q21Q     -0.014       0.005       0.085       0.072       0.048      -0.023
     Q21R     -0.005       0.151       0.151       0.085      -0.006      -0.037
     Q21S      0.055       0.076       0.075       0.003       0.014      -0.029
     Q22A     -0.007       0.013       0.047      -0.018      -0.021      -0.030
     Q22B      0.039      -0.084      -0.027      -0.087      -0.118      -0.100
     Q22C     -0.001      -0.081      -0.038      -0.057      -0.082      -0.114
     Q22D     -0.035       0.099       0.103       0.093       0.019       0.091
     Q22E     -0.003       0.049       0.034       0.076       0.053       0.072
     Q22F      0.000       0.043       0.054       0.003       0.019       0.013
    MSE90      0.031      -0.027       0.060       0.008       0.005       0.011

          CORRELATION MATRIX
             MOTHEDUC      INCOME     ATHPART     ETHPART       JOURN    ARTMUSIC
             ________   _________   _________   _________   _________   _________
 MOTHEDUC      1.000
   INCOME      0.463       1.000
  ATHPART      0.100       0.139       1.000
  ETHPART      0.114       0.061       0.110       1.000
    JOURN      0.158       0.086      -0.087       0.128       1.000
 ARTMUSIC      0.238       0.125      -0.095       0.193       0.268       1.000
 DEPTCLUB      0.030      -0.013      -0.098       0.155       0.108      -0.045
    RELIG      0.137       0.108       0.083       0.184       0.212       0.244
  SOCCLUB      0.134       0.115       0.013       0.226       0.241       0.167
 STUDGOVT      0.053       0.010       0.102       0.175       0.373       0.182
  ACTABIL      0.117       0.003       0.089       0.057       0.383       0.202
  ARTABIL      0.052       0.047       0.045       0.056       0.081       0.205
 ATHLABIL      0.077       0.079       0.709       0.059      -0.113      -0.157
 CWRITABL      0.107       0.084       0.025       0.074       0.275       0.132
 OTHRABIL      0.099       0.049       0.102       0.124       0.151       0.082
 LEADABIL      0.096       0.047       0.130       0.109       0.289       0.107
 MATHABIL     -0.034      -0.049       0.044       0.009       0.038      -0.062
 MECHABIL      0.022       0.040       0.175      -0.018      -0.045      -0.085
  MUSABIL      0.228       0.127      -0.039       0.080       0.172       0.633
  ORGABIL      0.091       0.087      -0.006       0.128       0.219       0.102
 SALEABIL      0.074       0.039       0.138       0.138       0.164       0.051
  SCIABIL      0.132       0.104       0.031       0.077       0.197       0.081
 SPEAKABL      0.130       0.085       0.069       0.113       0.339       0.141
 WRITABIL      0.113       0.080      -0.036       0.088       0.298       0.144
    MVDIF     -0.143      -0.151       0.102      -0.014      -0.289      -0.179
       IA      0.012      -0.031       0.001       0.076       0.006      -0.001
       IB      0.065       0.031      -0.057       0.120       0.060       0.023
       IC      0.005      -0.005      -0.007       0.037      -0.033       0.006
       ID      0.077       0.079      -0.026       0.089       0.038       0.023
       IE      0.096      -0.012       0.052       0.101       0.013       0.023
       IF      0.020      -0.008      -0.011       0.066       0.015       0.050
       IG      0.028       0.014       0.031       0.075       0.024       0.006
       IH      0.091       0.053       0.013       0.047       0.072       0.081
       II      0.010      -0.014       0.091       0.098      -0.075      -0.053
       IJ      0.039      -0.017       0.038       0.094      -0.022      -0.015
       IK      0.037       0.103       0.045       0.047       0.012      -0.027
       IL     -0.004      -0.065      -0.061       0.050       0.032       0.002
       IM      0.023       0.061       0.125       0.078      -0.052       0.024
      IIA      0.190       0.085      -0.003       0.073       0.064       0.070
      IIB      0.157       0.337       0.020       0.057       0.065       0.106
      IIC     -0.093      -0.025      -0.022       0.051      -0.023      -0.003
      IID     -0.014      -0.070      -0.003       0.052       0.000       0.029
      IIE     -0.045      -0.051       0.008       0.045      -0.017       0.019
      IIF     -0.080      -0.127      -0.020      -0.018      -0.008       0.011
      IIG     -0.070      -0.102      -0.068       0.014       0.037       0.000
```

IIH	-0.138	-0.120	-0.023	0.027	-0.059	-0.055
III	-0.001	0.019	0.531	-0.006	-0.127	-0.098
IIJ	-0.001	-0.013	0.112	-0.010	0.071	0.030
IIK	-0.014	-0.092	0.044	0.057	-0.042	-0.005
IIL	0.060	-0.007	0.079	0.070	0.021	0.036
IIM	-0.047	-0.047	-0.023	0.043	-0.043	-0.013
IIN	-0.053	-0.041	0.012	0.041	-0.044	0.022
IIO	-0.029	-0.063	-0.014	0.000	0.057	0.009
IIP	0.000	-0.066	0.017	0.055	-0.004	0.012
IIQ	0.054	0.012	-0.006	0.172	0.039	0.059
IIR	0.106	0.082	-0.064	0.166	0.095	0.138
IIS	0.067	0.077	0.020	0.138	0.075	0.040
IIT	0.015	0.003	0.083	0.092	0.001	-0.032
IIU	0.042	-0.031	0.000	0.088	-0.001	0.052
IIV	0.086	0.084	0.085	0.089	0.018	0.054
IIW	0.017	0.031	0.069	0.078	-0.009	0.020
IIX	0.042	0.060	0.001	0.066	0.074	0.057
NPGMS	0.013	-0.004	-0.033	0.000	0.039	0.064
NPEOPLE	-0.006	0.008	-0.008	-0.019	0.011	-0.018
COLTYPE	0.148	0.083	0.105	0.032	0.173	0.065
Q12A	0.026	0.008	-0.046	-0.017	0.107	0.052
Q12B	0.015	0.059	0.060	-0.005	0.044	0.054
Q12C	-0.010	-0.011	-0.017	-0.040	0.016	0.018
Q12D	-0.032	0.008	-0.024	-0.022	0.058	0.006
Q12E	-0.034	-0.025	-0.046	-0.001	0.011	-0.014
Q12F	-0.019	-0.007	0.031	-0.012	0.057	0.022
Q12G	0.100	0.058	-0.059	0.035	0.170	0.161
Q12H	0.033	0.030	0.017	0.045	0.078	0.054
Q12I	0.040	0.043	0.041	0.025	0.057	0.007
Q12J	-0.022	-0.016	0.008	-0.033	0.080	0.023
Q12K	0.029	0.022	0.163	-0.023	0.019	-0.015
Q12L	-0.063	-0.009	-0.005	-0.102	-0.054	-0.058
Q12M	0.032	0.003	0.058	0.053	0.076	0.009
Q12N	0.032	-0.035	0.035	0.014	-0.041	-0.032
Q12O	-0.013	0.051	-0.017	-0.060	-0.034	-0.003
COLGPA	0.043	0.068	-0.092	0.010	0.170	0.081
MSEGPA	0.009	0.003	-0.026	-0.045	0.022	0.000
Q19A	-0.005	-0.114	-0.009	0.107	-0.019	-0.036
Q19B	-0.019	-0.088	0.026	0.061	-0.091	-0.057
Q19C	-0.002	-0.014	0.091	0.143	-0.033	-0.054
Q19D	-0.015	-0.041	0.076	0.022	-0.064	-0.067
Q19E	-0.045	-0.056	0.043	-0.009	-0.072	-0.062
Q19F	0.008	-0.013	0.043	-0.023	-0.031	-0.034
Q19G	0.031	-0.045	-0.008	-0.019	-0.030	-0.036
Q19H	0.054	-0.076	-0.027	0.168	-0.050	0.000
Q19I	0.044	-0.024	0.019	0.009	-0.028	-0.028
Q19J	0.016	0.027	0.022	-0.010	0.023	0.019
Q19K	0.059	0.033	-0.023	-0.002	-0.028	0.045
Q19L	0.010	-0.076	-0.026	0.131	-0.024	0.005
Q19M	0.064	0.006	-0.035	0.049	0.001	0.039
Q19N	-0.173	-0.364	-0.028	0.025	0.017	-0.022
Q19O	0.035	-0.028	0.054	0.082	-0.020	-0.022
Q19P	-0.002	-0.043	-0.005	0.070	0.023	-0.012
Q19Q	-0.013	-0.078	0.018	0.148	-0.010	-0.055
Q19R	0.003	-0.047	0.034	0.018	-0.104	-0.013
Q19S	0.023	-0.019	0.068	0.032	-0.098	-0.075
Q21A	-0.020	0.034	0.036	0.115	0.011	-0.044
Q21B	0.011	0.045	0.078	-0.036	-0.109	-0.015
Q21C	0.006	0.043	0.105	0.042	-0.072	-0.066
Q21D	0.063	0.042	0.066	0.059	0.026	0.048
Q21E	-0.036	-0.006	-0.018	0.012	-0.166	-0.114
Q21F	-0.005	-0.089	0.111	0.105	0.109	0.013
Q21G	-0.133	-0.152	0.039	-0.031	-0.099	-0.098
Q21H	-0.057	-0.006	-0.039	0.025	-0.122	-0.066

```
    Q21I      0.031      -0.042       0.065       0.001       0.048       0.044
    Q21J      0.028      -0.114      -0.024       0.169       0.146       0.098
    Q21K      0.023       0.028       0.007       0.037      -0.053       0.014
    Q21L      0.089       0.089       0.024      -0.016       0.028       0.072
    Q21M     -0.043      -0.055       0.022       0.044      -0.044      -0.014
    Q21N     -0.040      -0.058       0.026       0.020      -0.065      -0.024
    Q21O     -0.021      -0.087      -0.067       0.113       0.017       0.135
    Q21P      0.010      -0.071       0.009       0.080       0.079       0.084
    Q21Q     -0.014      -0.043       0.014       0.044      -0.030       0.003
    Q21R      0.008      -0.065       0.018       0.084       0.098       0.108
    Q21S     -0.003      -0.029       0.056       0.027       0.022       0.006
    Q22A      0.007      -0.011       0.004       0.066      -0.014       0.000
    Q22B     -0.049      -0.071       0.045       0.022      -0.105      -0.097
    Q22C     -0.076      -0.050      -0.041       0.005      -0.171      -0.115
    Q22D      0.091       0.042      -0.077       0.068       0.135       0.171
    Q22E      0.044       0.012       0.017       0.054       0.100       0.073
    Q22F      0.010       0.007       0.022       0.006      -0.011       0.065
   MSE90      0.056      -0.006       0.024      -0.012      -0.108      -0.099

        CORRELATION MATRIX
            DEPTCLUB       RELIG     SOCCLUB    STUDGOVT     ACTABIL     ARTABIL

            ________    ________    ________    ________    ________    ________
DEPTCLUB      1.000
   RELIG      0.069       1.000
 SOCCLUB      0.085       0.192       1.000
STUDGOVT      0.075       0.209       0.234       1.000
 ACTABIL      0.078       0.123       0.161       0.143       1.000
 ARTABIL      0.042       0.051       0.087      -0.021       0.401       1.000
ATHLABIL     -0.039      -0.018       0.016       0.025       0.199       0.220
CWRITABL      0.085       0.093       0.182       0.149       0.411       0.348
OTHRABIL      0.101       0.136       0.215       0.233       0.308       0.170
LEADABIL      0.133       0.137       0.265       0.404       0.440       0.211
MATHABIL      0.146       0.021       0.111       0.091       0.154       0.149
MECHABIL      0.138      -0.046      -0.015      -0.074       0.259       0.343
 MUSABIL      0.009       0.145       0.128       0.091       0.357       0.290
 ORGABIL      0.143       0.177       0.262       0.190       0.282       0.261
SALEABIL      0.112       0.097       0.209       0.153       0.408       0.206
 SCIABIL      0.196       0.099       0.157       0.112       0.307       0.309
SPEAKABL      0.127       0.133       0.227       0.235       0.516       0.250
WRITABIL      0.085       0.144       0.201       0.174       0.381       0.282
   MVDIF     -0.031      -0.084      -0.116      -0.139      -0.097      -0.061
      IA      0.057       0.018       0.072       0.025       0.067       0.067
      IB      0.108       0.053       0.092       0.054       0.108       0.093
      IC      0.030      -0.066       0.050      -0.073       0.051       0.071
      ID      0.053       0.004       0.058      -0.050       0.048       0.079
      IE      0.137      -0.018       0.060       0.018       0.062       0.045
      IF      0.208       0.068       0.010       0.040       0.080       0.065
      IG      0.113       0.003       0.026       0.005       0.040       0.057
      IH      0.123       0.015       0.099       0.057       0.076       0.090
      II      0.122       0.015       0.026       0.003       0.019      -0.009
      IJ      0.165       0.065       0.069       0.061       0.048      -0.005
      IK      0.096      -0.014       0.019       0.003      -0.041      -0.015
      IL      0.270       0.036       0.132       0.120       0.050       0.031
      IM      0.159      -0.021       0.048       0.036       0.034       0.048
     IIA      0.052       0.082       0.127       0.090       0.066       0.076
     IIB     -0.009       0.082       0.107       0.035       0.044       0.096
     IIC      0.008       0.047      -0.004       0.049       0.011       0.049
     IID      0.055       0.067       0.062       0.076       0.018      -0.024
     IIE      0.100       0.050       0.068       0.037      -0.015       0.026
     IIF      0.061       0.064       0.042       0.023       0.018       0.014
     IIG      0.044       0.061       0.088       0.063       0.062       0.049
     IIH      0.021       0.034       0.047       0.040      -0.033      -0.030
     III     -0.088       0.005      -0.082       0.025      -0.019      -0.007
     IIJ      0.034       0.104       0.047       0.133       0.049       0.029
```

IIK	0.177	0.007	0.087	0.034	0.048	0.055
IIL	0.102	-0.011	0.088	0.057	0.074	0.104
IIM	0.075	0.048	0.058	-0.017	-0.022	0.017
IIN	0.021	0.047	0.093	-0.010	0.009	0.011
IIO	0.079	0.108	0.042	0.092	0.040	0.077
IIP	0.089	0.076	0.057	0.044	0.036	0.007
IIQ	0.129	0.090	0.121	0.086	0.073	-0.002
IIR	0.093	0.102	0.155	0.085	0.063	0.024
IIS	0.131	0.074	0.117	0.068	0.048	0.053
IIT	0.044	0.040	0.079	0.044	0.049	0.015
IIU	0.035	0.285	0.064	0.117	0.060	0.009
IIV	0.191	0.027	0.124	0.083	0.065	0.122
IIW	0.106	0.076	0.074	0.055	0.046	0.094
IIX	0.117	0.046	0.071	0.035	0.078	0.114
NPGMS	-0.003	-0.003	0.067	0.039	-0.039	-0.010
NPEOPLE	0.007	-0.033	0.036	-0.013	0.021	0.040
COLTYPE	0.023	0.061	0.120	0.184	0.055	-0.001
Q12A	0.000	0.067	0.021	0.039	0.074	0.031
Q12B	-0.053	0.037	0.060	0.012	0.082	0.031
Q12C	0.020	0.026	0.052	-0.015	0.058	0.037
Q12D	0.027	0.062	0.014	0.021	0.084	0.044
Q12E	0.005	0.046	0.051	0.072	0.040	-0.018
Q12F	0.026	0.063	0.028	0.024	0.057	0.005
Q12G	0.067	0.092	0.091	0.061	0.104	0.048
Q12H	0.015	0.053	0.056	0.071	0.079	0.030
Q12I	0.004	0.026	0.015	0.032	0.044	0.037
Q12J	-0.024	0.045	0.031	0.047	0.039	0.040
Q12K	-0.015	0.089	-0.007	0.022	0.002	-0.014
Q12L	-0.004	0.011	-0.059	-0.033	-0.037	-0.035
Q12M	0.004	0.049	0.089	0.094	0.066	-0.006
Q12N	0.054	0.056	0.014	-0.005	-0.016	-0.005
Q12O	-0.048	0.019	0.001	-0.053	-0.016	0.049
COLGPA	0.082	0.094	0.144	0.098	0.066	0.062
MSEGPA	0.047	0.046	0.055	0.022	0.025	0.047
Q19A	0.075	0.030	0.047	0.038	0.036	-0.005
Q19B	-0.041	0.035	0.043	-0.006	-0.012	0.039
Q19C	-0.016	0.086	0.095	0.028	0.010	-0.009
Q19D	0.067	-0.001	0.029	-0.021	0.023	0.008
Q19E	0.029	0.031	-0.009	0.008	-0.015	-0.028
Q19F	0.041	0.001	0.038	-0.028	0.022	0.023
Q19G	0.081	0.027	-0.004	-0.003	-0.016	0.060
Q19H	0.133	0.072	0.059	0.077	-0.021	0.029
Q19I	0.121	0.008	0.027	0.035	0.001	0.035
Q19J	0.071	0.039	0.064	0.005	0.009	0.053
Q19K	0.034	0.041	0.107	0.083	0.008	0.047
Q19L	0.092	0.037	0.046	0.094	-0.010	-0.002
Q19M	-0.003	0.028	0.063	0.063	0.039	0.044
Q19N	0.095	0.056	-0.023	0.089	0.001	0.018
Q19O	0.096	-0.006	0.060	0.013	0.022	0.041
Q19P	0.064	0.082	0.084	0.039	0.035	0.035
Q19Q	0.094	-0.004	0.025	0.024	0.009	-0.050
Q19R	0.041	0.031	0.001	0.004	-0.019	-0.017
Q19S	0.113	0.026	0.013	-0.016	-0.048	-0.005
Q21A	0.061	0.056	0.082	0.012	-0.004	-0.002
Q21B	0.040	0.067	0.062	0.022	0.034	0.011
Q21C	-0.010	-0.113	-0.040	-0.062	0.033	0.011
Q21D	-0.002	0.004	0.057	0.029	0.035	-0.019
Q21E	-0.055	-0.012	-0.037	-0.072	-0.045	-0.004
Q21F	0.093	0.140	0.125	0.190	0.125	-0.004
Q21G	0.035	0.004	0.007	0.074	0.015	-0.061
Q21H	0.007	-0.016	-0.014	-0.016	-0.029	-0.014
Q21I	0.029	-0.055	-0.044	-0.007	0.050	-0.007
Q21J	0.064	0.095	0.092	0.145	0.132	0.027
Q21K	-0.045	0.047	0.001	0.063	0.067	-0.031

```
      Q21L     -0.042      -0.031      -0.032      -0.018       0.012       0.017
      Q21M      0.078      -0.008       0.028      -0.010       0.012       0.103
      Q21N      0.055      -0.039      -0.028      -0.042       0.006       0.080
      Q21O      0.024       0.017       0.016       0.026       0.115       0.161
      Q21P      0.024       0.065       0.082       0.129       0.117       0.032
      Q21Q      0.049      -0.034       0.000      -0.034       0.045       0.111
      Q21R      0.025       0.087       0.113       0.155       0.081       0.071
      Q21S      0.041       0.014       0.054       0.069       0.031       0.012
      Q22A      0.074       0.029       0.017      -0.020      -0.003       0.016
      Q22B     -0.007      -0.050      -0.036      -0.044       0.005       0.005
      Q22C     -0.033      -0.025      -0.037       0.007      -0.052      -0.055
      Q22D      0.122       0.035       0.090       0.098       0.043      -0.020
      Q22E      0.032       0.021       0.023       0.034       0.098       0.100
      Q22F     -0.002      -0.010       0.060       0.024       0.008       0.005
     MSE90      0.069       0.033      -0.017      -0.017      -0.073      -0.022

          CORRELATION MATRIX
             ATHLABIL    CWRITABL    OTHRABIL    LEADABIL    MATHABIL    MECHABIL

             ________    ________    ________    ________    ________    ________
  ATHLABIL      1.000
  CWRITABL      0.176       1.000
  OTHRABIL      0.282       0.349       1.000
  LEADABIL      0.285       0.417       0.586       1.000
  MATHABIL      0.190       0.250       0.262       0.336       1.000
  MECHABIL      0.322       0.212       0.218       0.314       0.370       1.000
   MUSABIL      0.084       0.290       0.241       0.274       0.140       0.183
   ORGABIL      0.108       0.421       0.414       0.542       0.372       0.283
  SALEABIL      0.237       0.302       0.407       0.487       0.239       0.302
   SCIABIL      0.216       0.432       0.320       0.406       0.520       0.408
  SPEAKABL      0.185       0.514       0.482       0.609       0.259       0.252
  WRITABIL      0.102       0.780       0.377       0.433       0.279       0.188
     MVDIF      0.160      -0.248      -0.040      -0.072       0.225       0.070
        IA      0.036       0.040       0.065       0.137       0.272       0.111
        IB     -0.003       0.071       0.088       0.142       0.083       0.096
        IC      0.068       0.007       0.011       0.049       0.162       0.101
        ID      0.050       0.052       0.023       0.062       0.018       0.068
        IE      0.058      -0.015       0.083       0.007      -0.073       0.054
        IF      0.020       0.070       0.062       0.095       0.020       0.081
        IG      0.034       0.075       0.054       0.058      -0.003       0.067
        IH      0.032       0.110       0.040       0.091      -0.033       0.030
        II      0.089       0.007       0.068       0.064      -0.028       0.048
        IJ      0.046       0.038       0.099       0.079       0.016       0.028
        IK      0.025       0.003       0.042       0.016      -0.063       0.001
        IL     -0.023       0.015       0.091       0.097       0.106       0.005
        IM      0.112       0.005       0.068       0.083      -0.020       0.098
       IIA      0.014       0.063       0.090       0.108       0.033       0.005
       IIB      0.027       0.055       0.050       0.092       0.059       0.101
       IIC      0.048       0.026       0.031       0.070       0.080       0.052
       IID     -0.005       0.017       0.049       0.062       0.010      -0.014
       IIE     -0.003       0.001       0.054       0.073       0.064       0.060
       IIF     -0.037       0.003       0.021       0.055       0.143       0.016
       IIG     -0.061       0.094       0.075       0.102       0.001      -0.005
       IIH     -0.023      -0.026       0.042       0.032       0.062      -0.017
       III      0.439      -0.017       0.036       0.068       0.005       0.068
       IIJ      0.090       0.037       0.076       0.146       0.062       0.064
       IIK      0.044       0.036       0.059       0.087       0.107       0.096
       IIL      0.086       0.103       0.098       0.119       0.046       0.097
       IIM      0.014      -0.007       0.035       0.022       0.108       0.045
       IIN      0.018       0.030       0.040       0.028       0.024       0.010
       IIO     -0.007       0.060       0.066       0.066       0.114       0.003
       IIP     -0.001       0.009       0.049       0.077       0.026       0.019
       IIQ     -0.023       0.057       0.151       0.116      -0.018      -0.005
       IIR     -0.109       0.079       0.118       0.118      -0.029      -0.087
       IIS     -0.007       0.062       0.101       0.125       0.042       0.049
```

IIT	0.069	-0.002	0.148	0.133	0.032	0.080
IIU	-0.009	0.024	0.078	0.110	-0.026	-0.023
IIV	0.069	0.070	0.128	0.136	0.022	0.075
IIW	0.057	0.052	0.072	0.099	0.035	0.035
IIX	0.003	0.125	0.042	0.072	0.052	0.087
NPGMS	-0.090	-0.023	-0.041	-0.050	0.016	-0.045
NPEOPLE	-0.009	0.007	0.023	0.004	0.030	-0.004
COLTYPE	0.078	0.155	0.048	0.114	0.046	0.000
Q12A	-0.036	0.068	0.060	0.055	0.046	-0.033
Q12B	0.058	0.027	0.051	0.048	-0.004	-0.020
Q12C	0.024	0.048	0.055	0.077	0.073	0.010
Q12D	0.028	0.083	0.094	0.111	0.111	0.021
Q12E	-0.032	0.042	0.067	0.066	0.036	-0.018
Q12F	0.025	0.057	0.083	0.064	0.055	-0.011
Q12G	-0.046	0.083	0.066	0.076	-0.016	-0.027
Q12H	0.012	0.110	0.080	0.108	0.091	-0.001
Q12I	0.039	0.062	0.049	0.060	0.123	-0.003
Q12J	-0.017	0.069	0.037	0.053	0.089	-0.029
Q12K	0.106	-0.009	0.039	0.050	0.063	-0.012
Q12L	-0.001	-0.041	-0.050	-0.054	-0.022	0.002
Q12M	0.064	0.098	0.083	0.129	0.130	-0.015
Q12N	0.064	-0.004	0.053	0.032	0.121	0.046
Q12O	0.001	-0.014	-0.030	-0.021	0.053	0.062
COLGPA	-0.079	0.142	-0.013	0.046	0.183	-0.020
MSEGPA	0.005	0.016	-0.024	0.004	0.260	0.036
Q19A	0.028	-0.021	0.070	0.074	0.051	0.045
Q19B	0.068	-0.028	0.054	0.038	0.104	0.037
Q19C	0.022	-0.027	0.088	0.054	-0.030	0.004
Q19D	0.103	-0.050	0.042	0.053	0.058	0.093
Q19E	0.086	-0.054	0.049	0.036	0.006	0.039
Q19F	0.094	-0.017	0.029	0.019	0.102	0.106
Q19G	0.051	-0.017	0.030	0.030	0.225	0.136
Q19H	0.023	-0.033	0.068	0.070	0.037	0.030
Q19I	0.015	0.010	0.054	0.029	0.121	0.045
Q19J	-0.021	0.023	0.083	0.038	0.073	0.048
Q19K	-0.027	-0.026	0.064	0.064	0.065	0.044
Q19L	-0.021	-0.019	0.123	0.095	0.027	-0.040
Q19M	-0.021	0.010	0.146	0.148	0.143	0.034
Q19N	-0.058	0.005	-0.007	0.038	0.095	-0.005
Q19O	0.058	0.005	0.050	0.058	0.144	0.137
Q19P	-0.029	0.033	0.089	0.101	0.048	0.016
Q19Q	0.016	-0.014	0.066	0.035	0.036	-0.006
Q19R	0.066	-0.073	0.061	0.054	0.203	0.075
Q19S	0.087	-0.059	0.053	0.047	0.243	0.133
Q21A	0.057	0.011	0.101	0.058	0.066	-0.031
Q21B	0.098	-0.015	0.060	0.071	0.051	0.055
Q21C	0.153	-0.020	0.003	0.015	0.060	0.070
Q21D	0.037	0.022	0.105	0.046	0.046	0.025
Q21E	0.036	-0.111	0.068	-0.021	0.020	-0.018
Q21F	0.095	0.057	0.174	0.291	0.070	0.082
Q21G	0.069	-0.071	0.069	0.081	0.017	0.026
Q21H	0.018	-0.026	0.048	0.045	0.044	0.022
Q21I	0.028	-0.012	-0.010	-0.002	-0.029	-0.032
Q21J	-0.052	0.072	0.135	0.133	-0.031	-0.032
Q21K	0.034	0.001	0.121	0.071	0.034	-0.032
Q21L	0.025	-0.006	0.033	-0.006	0.044	0.006
Q21M	0.037	0.032	0.036	0.041	0.146	0.151
Q21N	0.051	0.017	0.041	0.034	0.145	0.159
Q21O	-0.050	0.083	0.071	0.048	0.022	0.059
Q21P	0.038	0.075	0.142	0.146	0.011	-0.035
Q21Q	0.051	0.067	0.020	0.061	0.151	0.176
Q21R	-0.002	0.068	0.112	0.131	-0.016	0.017
Q21S	0.066	-0.009	0.109	0.116	0.059	-0.013
Q22A	-0.009	-0.027	-0.002	-0.011	-0.031	0.017

```
     Q22B      0.094     -0.037      0.036     -0.003      0.052      0.021
     Q22C      0.010     -0.119      0.015     -0.044      0.029     -0.041
     Q22D     -0.039      0.065      0.065      0.022     -0.058     -0.048
     Q22E      0.047      0.092      0.074      0.096      0.023      0.095
     Q22F     -0.026     -0.040      0.150      0.065      0.009     -0.018
    MSE90      0.042     -0.067     -0.036     -0.029      0.172      0.127

          CORRELATION MATRIX
              MUSABIL    ORGABIL   SALEABIL    SCIABIL   SPEAKABL   WRITABIL
             ________   ________   ________   ________   ________   ________
  MUSABIL      1.000
  ORGABIL      0.264      1.000
 SALEABIL      0.223      0.459      1.000
  SCIABIL      0.249      0.494      0.349      1.000
 SPEAKABL      0.322      0.517      0.488      0.488      1.000
 WRITABIL      0.304      0.508      0.344      0.486      0.645      1.000
    MVDIF     -0.101     -0.088      0.009     -0.123     -0.219     -0.271
       IA     -0.005      0.122      0.072      0.125      0.089      0.061
       IB      0.020      0.126      0.083      0.225      0.140      0.088
       IC      0.012      0.045      0.076      0.044      0.032     -0.008
       ID      0.028      0.051      0.067      0.130      0.088      0.053
       IE      0.024     -0.033      0.070     -0.007      0.052     -0.014
       IF      0.045      0.070      0.083      0.061      0.063      0.043
       IG      0.009      0.068      0.029      0.080      0.066      0.025
       IH      0.086      0.061      0.039      0.132      0.095      0.083
       II     -0.035      0.009      0.062      0.000      0.036     -0.024
       IJ     -0.020      0.025      0.028      0.006      0.050      0.035
       IK     -0.066     -0.008      0.014      0.031      0.015     -0.021
       IL      0.035      0.106      0.057      0.132      0.058      0.035
       IM      0.020     -0.013      0.048      0.042      0.065      0.007
      IIA      0.096      0.097      0.108      0.095      0.092      0.068
      IIB      0.097      0.102      0.069      0.142      0.095      0.078
      IIC     -0.003      0.081      0.045      0.040      0.020      0.041
      IID      0.017      0.047      0.088     -0.043      0.054      0.029
      IIE      0.005      0.057      0.052      0.079      0.035      0.034
      IIF     -0.040      0.090     -0.011      0.113      0.044      0.011
      IIG      0.002      0.099      0.072      0.043      0.109      0.109
      IIH     -0.022      0.041      0.029     -0.010     -0.005     -0.008
      III     -0.051     -0.042      0.044     -0.008     -0.015     -0.061
      IIJ      0.025      0.099      0.092      0.097      0.106      0.068
      IIK      0.031      0.072      0.092      0.124      0.049      0.012
      IIL      0.063      0.119      0.115      0.147      0.122      0.066
      IIM     -0.002      0.065      0.019      0.109      0.015      0.036
      IIN      0.026      0.061      0.042      0.069      0.034      0.069
      IIO      0.017      0.122      0.015      0.155      0.035      0.079
      IIP      0.011      0.051      0.047     -0.011      0.055      0.008
      IIQ      0.064      0.121      0.068      0.046      0.129      0.086
      IIR      0.075      0.152      0.070      0.037      0.142      0.111
      IIS      0.029      0.124      0.074      0.130      0.113      0.069
      IIT      0.002      0.041      0.091     -0.021      0.050      0.015
      IIU      0.076      0.015      0.050     -0.037      0.046      0.030
      IIV      0.105      0.095      0.065      0.104      0.109      0.073
      IIW      0.036      0.070      0.059      0.009      0.065      0.063
      IIX      0.029      0.111      0.036      0.207      0.115      0.137
    NPGMS     -0.004      0.001     -0.061     -0.049     -0.031     -0.018
  NPEOPLE     -0.014      0.035     -0.009      0.011     -0.015      0.008
  COLTYPE      0.040      0.158      0.110      0.216      0.190      0.198
     Q12A      0.061      0.100      0.037      0.079      0.097      0.102
     Q12B      0.031      0.048      0.042      0.037      0.049      0.018
     Q12C      0.008      0.137      0.076      0.062      0.075      0.066
     Q12D      0.025      0.146      0.074      0.120      0.139      0.127
     Q12E      0.007      0.077      0.083      0.041      0.079      0.047
     Q12F      0.020      0.075      0.062      0.077      0.079      0.078
     Q12G      0.120      0.082      0.037      0.065      0.085      0.094
     Q12H      0.061      0.129      0.056      0.105      0.122      0.123
     Q12I      0.016      0.119      0.031      0.120      0.057      0.068
     Q12J      0.006      0.088      0.039      0.076      0.089      0.075
     Q12K     -0.030      0.017     -0.003      0.032      0.003     -0.008
     Q12L     -0.054     -0.063     -0.062     -0.046     -0.054     -0.075
     Q12M      0.020      0.128      0.077      0.112      0.117      0.110
     Q12N     -0.004      0.077     -0.012      0.109      0.024      0.029
     Q12O      0.026      0.006     -0.031      0.035     -0.032     -0.035
   COLGPA      0.050      0.201      0.033      0.206      0.115      0.178
   MSEGPA      0.013      0.108      0.033      0.164      0.027      0.037
     Q19A      0.022      0.053      0.048      0.005      0.054     -0.026
     Q19B     -0.009      0.051      0.046      0.054     -0.018     -0.013
     Q19C     -0.008      0.035      0.028     -0.058      0.020     -0.024
     Q19D     -0.029     -0.012      0.046      0.004     -0.012     -0.038
     Q19E     -0.016      0.003      0.040     -0.039     -0.016     -0.051
     Q19F     -0.057      0.013      0.017      0.067     -0.022     -0.045
     Q19G      0.023      0.042     -0.075      0.156     -0.046     -0.032
     Q19H      0.036      0.065      0.045      0.013      0.030      0.000
     Q19I     -0.011      0.077      0.019      0.119     -0.013      0.020
     Q19J      0.029      0.083     -0.001      0.169      0.045      0.050
     Q19K      0.028      0.133      0.035      0.109      0.040      0.027
     Q19L      0.015      0.055      0.059     -0.028      0.039     -0.022
     Q19M      0.063      0.092      0.033      0.137      0.067      0.089
     Q19N     -0.043      0.055      0.003      0.063      0.019      0.018
     Q19O      0.027      0.085      0.022      0.128      0.017      0.006
     Q19P      0.010      0.107      0.048      0.067      0.055      0.054
     Q19Q      0.006      0.035      0.075      0.007      0.019     -0.032
     Q19R      0.022      0.057     -0.013      0.139     -0.014     -0.045
     Q19S      0.011      0.041     -0.026      0.148     -0.042     -0.069
     Q21A      0.018      0.038      0.045     -0.022      0.035      0.015
     Q21B      0.038      0.044      0.029      0.003      0.035     -0.013
     Q21C      0.004     -0.005      0.114      0.007     -0.001     -0.043
     Q21D      0.078      0.021      0.051      0.058      0.084      0.026
     Q21E     -0.021      0.040      0.035     -0.105     -0.049     -0.077
     Q21F      0.066      0.180      0.200      0.087      0.167      0.105
     Q21G     -0.041      0.010      0.061     -0.055     -0.002     -0.072
     Q21H      0.006      0.051      0.047     -0.023     -0.005      0.009
     Q21I      0.003     -0.020     -0.028      0.003      0.007      0.006
     Q21J      0.080      0.107      0.066      0.041      0.130      0.132
     Q21K      0.029      0.081      0.079     -0.031      0.062      0.004
     Q21L      0.077      0.000      0.018      0.009     -0.001      0.014
     Q21M      0.045      0.101      0.017      0.238      0.013      0.032
     Q21N      0.022      0.074      0.019      0.186     -0.001      0.004
     Q21O      0.073      0.084      0.042      0.052      0.029      0.063
     Q21P      0.095      0.084      0.093     -0.008      0.105      0.091
     Q21Q      0.050      0.095      0.032      0.246      0.037      0.048
     Q21R      0.088      0.155      0.109      0.078      0.128      0.135
     Q21S      0.033      0.113      0.115      0.013      0.081      0.057
     Q22A     -0.018      0.010      0.021     -0.030     -0.014     -0.016
     Q22B     -0.040     -0.008      0.068     -0.053     -0.036     -0.033
     Q22C     -0.038     -0.012      0.011     -0.113     -0.095     -0.089
     Q22D      0.101      0.079      0.023      0.056      0.081      0.063
     Q22E      0.057      0.130      0.076      0.109      0.068      0.086
     Q22F      0.036      0.038      0.042     -0.043      0.011     -0.020
    MSE90     -0.032      0.015     -0.028      0.143     -0.056     -0.051

        CORRELATION MATRIX
                MVDIF         IA         IB         IC         ID         IE
               ________   ________   ________   ________   ________   ________
    MVDIF      1.000
       IA      0.124      1.000
       IB     -0.024      0.687      1.000
       IC      0.140      0.467      0.278      1.000
       ID      0.017      0.279      0.525      0.695      1.000
```

IE	-0.025	0.153	0.219	0.193	0.257	1.000
IF	0.004	0.114	0.165	0.086	0.128	0.287
IG	-0.017	0.094	0.154	0.123	0.164	0.346
IH	-0.046	0.113	0.196	0.128	0.200	0.189
II	0.033	0.138	0.164	0.123	0.120	0.262
IJ	-0.023	0.130	0.108	0.070	0.106	0.251
IK	-0.040	0.061	0.103	0.098	0.145	0.257
IL	0.069	0.185	0.209	0.114	0.171	0.117
IM	0.043	0.126	0.136	0.123	0.140	0.279
IIA	-0.002	0.078	0.112	0.048	0.097	0.077
IIB	-0.010	0.060	0.083	0.046	0.070	-0.024
IIC	0.066	0.067	0.036	0.069	0.023	-0.009
IID	0.063	0.084	0.049	0.063	0.038	0.117
IIE	0.033	0.099	0.088	0.067	0.071	0.039
IIF	0.062	0.228	0.182	0.117	0.096	0.027
IIG	-0.042	0.143	0.143	0.056	0.087	0.041
IIH	0.049	0.140	0.095	0.029	0.025	0.023
III	0.120	0.052	-0.028	0.031	-0.026	-0.005
IIJ	0.017	0.113	0.097	0.062	0.041	-0.006
IIK	0.094	0.200	0.187	0.138	0.144	0.124
IIL	0.022	0.156	0.181	0.163	0.186	0.153
IIM	0.058	0.234	0.167	0.141	0.106	0.024
IIN	0.033	0.106	0.065	0.069	0.075	0.047
IIO	0.026	0.045	0.058	0.031	0.032	-0.046
IIP	0.034	0.139	0.098	0.073	0.033	0.075
IIQ	-0.016	0.123	0.158	0.089	0.108	0.129
IIR	-0.101	0.094	0.124	0.069	0.094	0.068
IIS	-0.029	0.120	0.157	0.089	0.107	0.078
IIT	0.049	0.129	0.074	0.085	0.046	0.137
IIU	0.001	0.093	0.088	0.045	0.068	0.060
IIV	-0.028	0.124	0.163	0.103	0.112	0.163
IIW	0.015	0.097	0.112	0.063	0.063	0.101
IIX	-0.108	0.065	0.140	0.050	0.078	-0.019
NPGMS	-0.029	-0.059	-0.064	-0.075	-0.044	-0.128
NPEOPLE	0.014	-0.031	-0.027	0.013	-0.003	-0.042
COLTYPE	-0.182	0.055	0.090	0.064	0.106	0.047
Q12A	-0.058	0.027	0.028	-0.011	0.012	-0.016
Q12B	-0.022	0.021	0.003	0.018	0.039	-0.032
Q12C	0.018	0.073	0.067	0.047	0.039	0.011
Q12D	-0.009	0.086	0.056	0.037	0.027	-0.007
Q12E	0.024	0.065	0.058	0.045	0.042	0.017
Q12F	-0.035	0.003	0.011	-0.017	0.002	0.000
Q12G	-0.103	0.044	0.050	0.019	0.051	0.027
Q12H	-0.037	0.069	0.059	0.015	0.031	0.015
Q12I	0.009	0.071	0.084	0.021	0.039	-0.008
Q12J	-0.039	0.060	0.055	-0.011	0.019	-0.032
Q12K	0.004	0.018	-0.025	-0.003	-0.015	-0.067
Q12L	0.077	-0.029	-0.006	-0.015	-0.021	-0.055
Q12M	-0.038	0.118	0.076	0.071	0.065	0.034
Q12N	0.107	0.113	0.100	0.075	0.072	0.043
Q12O	0.096	0.061	0.032	0.027	0.032	-0.072
COLGPA	-0.110	0.108	0.097	0.040	0.053	-0.110
MSEGPA	0.080	0.161	0.086	0.120	0.051	-0.094
Q19A	0.119	0.096	0.118	0.108	0.085	0.187
Q19B	0.159	0.131	0.107	0.097	0.093	-0.003
Q19C	0.035	0.037	0.024	-0.017	0.003	0.079
Q19D	0.134	0.068	0.075	0.090	0.071	0.126
Q19E	0.095	0.044	0.010	0.066	0.064	0.096
Q19F	0.067	0.128	0.053	0.097	0.051	0.041
Q19G	0.140	0.131	0.108	0.136	0.133	0.037
Q19H	0.086	0.112	0.106	0.073	0.081	0.120
Q19I	0.081	0.127	0.116	0.093	0.088	0.057
Q19J	0.019	0.063	0.115	0.039	0.076	-0.015
Q19K	0.046	0.083	0.089	0.040	0.070	-0.002

Q19L	0.076	0.080	0.056	0.056	0.014	0.088
Q19M	0.047	0.135	0.127	0.076	0.063	0.055
Q19N	0.033	0.088	0.065	0.024	-0.001	-0.002
Q19O	0.053	0.111	0.108	0.102	0.109	0.086
Q19P	0.000	0.047	0.061	0.069	0.056	0.023
Q19Q	0.091	0.109	0.061	0.067	0.050	0.076
Q19R	0.204	0.124	0.135	0.089	0.068	0.049
Q19S	0.176	0.119	0.090	0.119	0.064	0.078
Q21A	0.054	0.023	0.055	0.047	0.043	-0.060
Q21B	0.107	-0.019	-0.011	0.017	0.036	-0.057
Q21C	0.119	0.049	0.023	0.070	0.055	0.019
Q21D	-0.020	0.045	0.040	0.074	0.057	0.055
Q21E	0.138	0.074	0.028	0.132	0.082	-0.003
Q21F	0.058	0.102	0.073	0.004	0.001	0.044
Q21G	0.146	0.080	0.080	0.084	0.094	-0.007
Q21H	0.117	0.061	0.024	0.081	0.090	-0.034
Q21I	-0.023	0.016	0.023	0.041	0.006	0.004
Q21J	-0.091	0.060	0.076	0.002	0.063	0.122
Q21K	0.105	0.028	0.013	0.045	0.019	-0.005
Q21L	0.013	0.018	0.018	0.027	0.053	-0.004
Q21M	0.084	0.064	0.083	0.111	0.080	0.060
Q21N	0.120	0.081	0.082	0.079	0.057	0.037
Q21O	0.045	0.057	0.060	0.053	0.068	0.069
Q21P	0.042	0.079	0.029	0.041	-0.005	0.003
Q21Q	0.096	0.106	0.115	0.107	0.084	0.043
Q21R	-0.034	0.046	0.057	0.022	0.055	-0.016
Q21S	0.109	0.068	0.040	0.082	0.028	-0.053
Q22A	0.045	0.082	0.102	0.073	0.092	0.079
Q22B	0.159	0.118	0.039	0.109	0.071	0.068
Q22C	0.221	0.110	0.063	0.132	0.077	-0.002
Q22D	-0.069	0.011	0.067	-0.027	-0.011	-0.018
Q22E	-0.019	0.061	0.065	0.025	0.045	0.018
Q22F	0.093	0.058	0.018	0.033	0.020	0.000
MSE90	0.146	0.111	0.084	0.069	0.028	0.056

CORRELATION MATRIX

	IF	IG	IH	II	IJ	IK
IF	1.000					
IG	0.337	1.000				
IH	0.355	0.344	1.000			
II	0.297	0.290	0.161	1.000		
IJ	0.272	0.295	0.213	0.645	1.000	
IK	0.214	0.336	0.248	0.507	0.543	1.000
IL	0.259	0.134	0.265	0.124	0.149	0.114
IM	0.282	0.385	0.195	0.462	0.387	0.429
IIA	0.138	0.034	0.101	0.080	0.120	0.047
IIB	0.069	0.045	0.054	0.007	0.039	0.023
IIC	0.042	0.026	0.011	0.002	0.048	0.005
IID	0.121	0.096	0.077	0.098	0.124	0.062
IIE	0.127	0.087	0.087	0.088	0.083	0.054
IIF	0.184	0.097	0.129	0.081	0.095	0.037
IIG	0.147	0.068	0.077	0.088	0.095	0.046
IIH	0.155	0.033	0.081	0.182	0.196	0.056
III	-0.007	0.020	0.020	0.082	0.057	0.079
IIJ	0.139	0.069	0.087	0.105	0.111	0.059
IIK	0.208	0.198	0.265	0.194	0.178	0.118
IIL	0.194	0.231	0.388	0.167	0.189	0.205
IIM	0.173	0.111	0.112	0.073	0.051	0.052
IIN	0.067	0.094	0.063	0.055	0.037	0.041
IIO	0.017	0.010	0.033	-0.044	-0.030	-0.157
IIP	0.233	0.101	0.099	0.285	0.342	0.136
IIQ	0.285	0.192	0.149	0.337	0.365	0.131
IIR	0.255	0.174	0.143	0.237	0.231	0.200

IIS	0.251	0.207	0.166	0.208	0.235	0.117
IIT	0.272	0.151	0.115	0.304	0.299	0.226
IIU	0.187	0.139	0.143	0.163	0.215	0.114
IIV	0.180	0.228	0.174	0.204	0.227	0.097
IIW	0.172	0.169	0.131	0.152	0.168	0.059
IIX	0.174	0.136	0.151	0.053	0.081	0.038
NPGMS	-0.092	-0.098	-0.117	-0.183	-0.160	-0.047
NPEOPLE	-0.042	-0.021	-0.022	-0.067	-0.060	-0.003
COLTYPE	0.012	-0.063	0.031	0.023	0.075	-0.041
Q12A	0.020	-0.036	0.008	-0.021	-0.014	-0.020
Q12B	0.006	-0.028	-0.021	-0.001	-0.015	0.026
Q12C	0.056	-0.014	0.040	-0.006	-0.015	0.001
Q12D	0.071	-0.010	0.024	0.009	0.011	-0.004
Q12E	0.085	0.003	0.045	0.075	0.084	0.039
Q12F	-0.012	-0.031	0.002	0.032	0.031	0.044
Q12G	0.088	0.053	0.018	0.093	0.059	0.014
Q12H	0.058	0.002	0.017	0.064	0.054	0.003
Q12I	0.025	-0.034	-0.040	0.007	0.001	-0.005
Q12J	-0.002	-0.039	-0.024	-0.031	-0.038	-0.019
Q12K	0.035	-0.014	-0.016	0.008	0.025	0.022
Q12L	-0.004	-0.081	-0.042	-0.019	-0.022	-0.023
Q12M	0.030	-0.002	0.006	0.060	0.112	-0.052
Q12N	0.068	0.004	0.048	0.044	0.098	0.009
Q12O	-0.012	-0.044	0.006	-0.041	-0.060	-0.041
COLGPA	-0.013	-0.021	0.058	-0.100	-0.058	-0.024
MSEGPA	-0.003	-0.002	0.041	-0.051	-0.041	0.013
Q19A	0.156	0.206	0.047	0.288	0.414	0.158
Q19B	0.103	0.001	0.049	0.021	-0.028	-0.030
Q19C	0.090	0.047	0.027	0.142	0.161	0.069
Q19D	0.123	0.059	0.059	0.188	0.158	0.142
Q19E	0.087	0.065	0.044	0.146	0.096	0.068
Q19F	0.080	0.059	0.070	0.074	0.130	0.127
Q19G	0.122	0.063	0.147	0.057	0.075	-0.046
Q19H	0.189	0.156	0.120	0.207	0.281	0.011
Q19I	0.105	0.062	0.164	0.033	0.084	-0.048
Q19J	0.060	0.029	0.108	0.041	0.111	0.012
Q19K	0.098	0.071	0.103	0.062	0.107	0.020
Q19L	0.141	0.104	0.053	0.191	0.243	0.067
Q19M	0.149	0.051	0.103	0.075	0.073	-0.111
Q19N	0.112	0.007	0.014	0.123	0.188	0.070
Q19O	0.145	0.103	0.120	0.146	0.183	0.059
Q19P	0.169	0.065	0.115	0.144	0.213	0.068
Q19Q	0.147	0.068	0.012	0.250	0.320	0.080
Q19R	0.083	-0.014	0.147	0.054	0.043	-0.069
Q19S	0.116	0.094	0.155	0.081	0.105	-0.048
Q21A	-0.003	-0.035	0.008	0.058	0.015	-0.007
Q21B	-0.021	-0.043	-0.033	-0.055	0.020	-0.081
Q21C	0.010	-0.021	-0.032	0.053	0.016	-0.045
Q21D	0.069	0.087	0.018	-0.015	-0.024	0.032
Q21E	-0.058	-0.060	-0.044	0.057	0.049	-0.040
Q21F	0.139	0.049	0.045	0.082	0.116	-0.036
Q21G	0.061	0.008	-0.033	0.066	0.082	-0.133
Q21H	0.022	-0.006	-0.013	0.030	0.003	-0.054
Q21I	0.029	0.066	0.050	0.018	0.022	0.055
Q21J	0.144	0.112	0.109	0.077	0.149	0.021
Q21K	0.020	-0.001	0.025	-0.042	-0.028	-0.056
Q21L	0.032	0.010	0.047	0.010	0.051	0.034
Q21M	0.127	0.053	0.107	-0.007	0.040	-0.022
Q21N	0.120	0.036	0.078	0.030	-0.004	-0.011
Q21O	0.122	0.051	0.081	-0.014	0.018	-0.016
Q21P	0.124	0.083	0.091	0.054	0.108	-0.004
Q21Q	0.136	0.076	0.134	0.016	0.049	-0.020
Q21R	0.102	0.062	0.095	-0.006	0.017	-0.029
Q21S	0.076	0.032	0.040	0.020	0.054	-0.046

```
     Q22A      0.143      0.090      0.083      0.102      0.078      0.030
     Q22B      0.057     -0.019      0.026      0.105      0.105     -0.039
     Q22C      0.027     -0.063      0.009      0.058      0.046     -0.115
     Q22D      0.108      0.066      0.080      0.059      0.100     -0.016
     Q22E      0.068      0.009     -0.021      0.023      0.003      0.000
     Q22F      0.095     -0.008      0.017      0.029      0.057     -0.002
    MSE90      0.063      0.020      0.055      0.065      0.071     -0.012

          CORRELATION MATRIX
                  IL         IM        IIA        IIB        IIC        IID
              _________  _________  _________  _________  _________  _________
       IL      1.000
       IM      0.154      1.000
      IIA      0.102      0.074      1.000
      IIB      0.042      0.037      0.563      1.000
      IIC      0.066      0.034      0.315      0.320      1.000
      IID      0.104      0.146      0.317      0.133      0.251      1.000
      IIE      0.119      0.097      0.306      0.214      0.246      0.390
      IIF      0.210      0.105      0.193      0.138      0.161      0.183
      IIG      0.138      0.100      0.323      0.213      0.196      0.229
      IIH      0.125      0.109      0.259      0.127      0.133      0.191
      III      0.021      0.111      0.095      0.067      0.108      0.137
      IIJ      0.137      0.123      0.265      0.164      0.187      0.229
      IIK      0.469      0.240      0.073      0.016      0.093      0.126
      IIL      0.207      0.202      0.081      0.025      0.023      0.091
      IIM      0.171      0.088      0.190      0.109      0.170      0.198
      IIN      0.084      0.083      0.252      0.158      0.228      0.255
      IIO      0.083     -0.017      0.028      0.005      0.018      0.015
      IIP      0.115      0.188      0.132      0.071      0.106      0.206
      IIQ      0.153      0.262      0.196      0.123      0.087      0.227
      IIR      0.112      0.167      0.198      0.085      0.049      0.196
      IIS      0.163      0.203      0.203      0.201      0.123      0.227
      IIT      0.102      0.397      0.114      0.087      0.083      0.167
      IIU      0.124      0.168      0.284      0.137      0.153      0.290
      IIV      0.107      0.259      0.128      0.140      0.086      0.130
      IIW      0.106      0.195      0.164      0.150      0.114      0.173
      IIX      0.128      0.107      0.124      0.143      0.123      0.126
    NPGMS     -0.076     -0.082     -0.016      0.000      0.002      0.026
  NPEOPLE      0.019     -0.029      0.004      0.037     -0.019      0.015
  COLTYPE      0.008      0.014      0.083      0.021      0.067      0.028
     Q12A      0.029     -0.040      0.065      0.058      0.015      0.051
     Q12B      0.024      0.027      0.051      0.079      0.004      0.010
     Q12C      0.043     -0.032      0.098      0.105      0.075      0.068
     Q12D      0.029     -0.010      0.119      0.116      0.060      0.059
     Q12E      0.061      0.042      0.052      0.077      0.069      0.105
     Q12F      0.029     -0.032      0.075      0.037     -0.003      0.029
     Q12G      0.069      0.036      0.023      0.057     -0.004      0.041
     Q12H      0.043      0.035      0.084      0.059      0.037      0.051
     Q12I      0.037     -0.017      0.072      0.106      0.034      0.042
     Q12J      0.042     -0.012      0.075      0.081      0.041      0.070
     Q12K      0.033     -0.029      0.019      0.037      0.016      0.006
     Q12L     -0.005      0.011      0.000      0.062      0.028      0.020
     Q12M      0.046      0.045      0.076      0.052      0.022      0.070
     Q12N      0.090      0.045      0.173      0.144      0.097      0.106
     Q12O      0.024     -0.014      0.047      0.124      0.038      0.033
   COLGPA      0.058     -0.054      0.057      0.139      0.062      0.010
   MSEGPA      0.099     -0.024      0.075      0.118      0.066      0.024
     Q19A      0.099      0.200      0.126      0.038      0.043      0.137
     Q19B      0.091      0.040      0.157      0.080      0.119      0.060
     Q19C      0.017      0.081      0.096      0.014      0.071      0.058
     Q19D      0.141      0.224      0.066      0.077      0.084      0.070
     Q19E      0.097      0.139      0.099      0.051      0.040      0.072
     Q19F      0.107      0.094      0.085      0.137      0.057      0.041
     Q19G      0.173      0.060      0.107      0.132      0.098      0.034
```

```
Q19H       0.173     0.167     0.170     0.079     0.079     0.174
Q19I       0.136     0.062     0.196     0.156     0.103     0.111
Q19J       0.181     0.068     0.170     0.142     0.063     0.134
Q19K       0.138     0.093     0.227     0.203     0.079     0.117
Q19L       0.136     0.144     0.189     0.083     0.097     0.196
Q19M       0.171     0.011     0.217     0.154     0.105     0.104
Q19N       0.146     0.085     0.040    -0.054     0.043     0.105
Q19O       0.142     0.193     0.110     0.120     0.092     0.081
Q19P       0.115     0.130     0.165     0.112     0.087     0.172
Q19Q       0.129     0.166     0.133     0.041     0.061     0.164
Q19R       0.159     0.015     0.147     0.122     0.130     0.062
Q19S       0.155     0.084     0.151     0.150     0.123     0.074
Q21A       0.020     0.002     0.137     0.133     0.035     0.057
Q21B       0.004    -0.043     0.065     0.130     0.061     0.024
Q21C      -0.063     0.066     0.083     0.058     0.028     0.048
Q21D      -0.020    -0.014     0.057     0.061     0.039     0.033
Q21E       0.021     0.053     0.079     0.077     0.023     0.053
Q21F       0.087     0.071     0.109     0.055     0.060     0.167
Q21G       0.098     0.047     0.139     0.050     0.099     0.162
Q21H       0.068     0.018     0.196     0.141     0.131     0.137
Q21I      -0.014     0.067    -0.053    -0.062    -0.011     0.036
Q21J       0.098     0.038     0.129     0.005     0.087     0.161
Q21K       0.017    -0.002     0.077     0.071     0.079     0.097
Q21L      -0.029     0.037     0.077     0.053     0.000     0.046
Q21M       0.162     0.063     0.116     0.106     0.116     0.093
Q21N       0.129     0.031     0.110     0.104     0.171     0.086
Q21O       0.128     0.016     0.109     0.077     0.096     0.107
Q21P       0.081     0.069     0.148     0.069     0.089     0.164
Q21Q       0.169     0.059     0.115     0.121     0.118     0.074
Q21R       0.096     0.007     0.150     0.083     0.117     0.144
Q21S       0.029     0.023     0.110     0.129     0.098     0.127
Q22A       0.075     0.123     0.122     0.070     0.078     0.099
Q22B       0.020     0.088     0.087     0.027     0.009     0.049
Q22C       0.072     0.068     0.122     0.049     0.063     0.050
Q22D       0.108     0.027     0.126     0.087     0.052     0.032
Q22E       0.025    -0.010     0.105     0.117     0.051     0.010
Q22F       0.075    -0.004     0.099     0.083     0.011     0.054
MSE90      0.083     0.093     0.097     0.123     0.065     0.012

     CORRELATION MATRIX
             IIE       IIF       IIG       IIH       III       IIJ
          _______   _______   _______   _______   _______   _______
IIE        1.000
IIF        0.380     1.000
IIG        0.382     0.524     1.000
IIH        0.308     0.374     0.424     1.000
III        0.141     0.099     0.142     0.169     1.000
IIJ        0.297     0.304     0.375     0.405     0.417     1.000
IIK        0.122     0.210     0.147     0.092     0.127     0.216
IIL        0.067     0.112     0.089     0.036     0.160     0.185
IIM        0.497     0.478     0.362     0.270     0.121     0.276
IIN        0.537     0.335     0.422     0.261     0.171     0.320
IIO        0.030     0.107     0.061     0.063    -0.014     0.039
IIP        0.205     0.230     0.243     0.326     0.119     0.266
IIQ        0.172     0.145     0.156     0.204     0.072     0.240
IIR        0.144     0.152     0.167     0.159     0.016     0.219
IIS        0.241     0.193     0.181     0.189     0.108     0.279
IIT        0.161     0.136     0.181     0.192     0.194     0.291
IIU        0.215     0.142     0.242     0.222     0.162     0.368
IIV        0.158     0.100     0.115     0.074     0.116     0.142
IIW        0.214     0.152     0.217     0.191     0.129     0.279
IIX        0.171     0.198     0.194     0.094     0.046     0.225
NPGMS      0.001     0.028     0.002     0.016    -0.001     0.036
NPEOPLE    0.020     0.011     0.019     0.002     0.024     0.021
```

COLTYPE	0.010	0.035	0.020	-0.023	0.047	0.054
Q12A	0.039	0.118	0.079	0.071	0.011	0.076
Q12B	0.064	0.041	0.053	0.080	0.030	0.092
Q12C	0.090	0.135	0.102	0.071	0.050	0.114
Q12D	0.084	0.140	0.099	0.090	0.033	0.091
Q12E	0.078	0.099	0.085	0.148	0.013	0.130
Q12F	0.033	0.091	0.048	0.076	0.009	0.074
Q12G	0.057	0.076	0.094	0.087	-0.005	0.089
Q12H	0.042	0.124	0.071	0.099	-0.008	0.074
Q12I	0.031	0.147	0.067	0.101	0.037	0.075
Q12J	0.043	0.132	0.106	0.088	0.051	0.095
Q12K	0.039	0.091	0.025	0.057	0.101	0.075
Q12L	0.032	-0.029	-0.041	0.006	0.024	0.014
Q12M	0.049	0.111	0.079	0.107	0.052	0.094
Q12N	0.116	0.163	0.059	0.146	0.070	0.129
Q12O	0.070	0.038	-0.003	0.043	0.027	0.032
COLGPA	0.040	0.087	0.037	-0.023	-0.024	-0.003
MSEGPA	0.063	0.107	0.037	-0.012	0.037	0.025
Q19A	0.056	0.096	0.083	0.173	0.056	0.093
Q19B	0.118	0.170	0.068	0.138	0.065	0.067
Q19C	0.115	0.124	0.085	0.109	0.055	0.090
Q19D	0.129	0.098	0.085	0.100	0.116	0.121
Q19E	0.084	0.088	0.079	0.109	0.126	0.104
Q19F	0.136	0.179	0.082	0.152	0.068	0.146
Q19G	0.155	0.230	0.030	0.093	0.055	0.108
Q19H	0.168	0.126	0.111	0.183	0.084	0.160
Q19I	0.155	0.244	0.069	0.136	0.085	0.125
Q19J	0.164	0.191	0.061	0.120	0.021	0.080
Q19K	0.195	0.141	0.120	0.148	0.011	0.149
Q19L	0.177	0.135	0.104	0.204	0.059	0.142
Q19M	0.170	0.220	0.135	0.140	0.035	0.115
Q19N	0.107	0.123	0.107	0.177	0.052	0.111
Q19O	0.098	0.094	0.069	0.100	0.090	0.125
Q19P	0.187	0.151	0.119	0.222	0.077	0.163
Q19Q	0.125	0.101	0.072	0.207	0.061	0.121
Q19R	0.149	0.177	0.037	0.082	0.049	0.098
Q19S	0.150	0.151	0.003	0.091	0.090	0.078
Q21A	0.061	0.061	0.028	0.041	0.012	0.067
Q21B	0.087	-0.023	-0.018	0.024	0.049	0.035
Q21C	0.037	-0.082	-0.022	0.043	0.052	-0.029
Q21D	0.099	0.096	0.079	0.073	0.033	0.085
Q21E	0.039	0.033	0.017	0.093	0.036	0.014
Q21F	0.126	0.119	0.157	0.148	0.097	0.155
Q21G	0.115	0.109	0.090	0.165	0.048	0.075
Q21H	0.064	0.055	0.081	0.117	0.034	0.041
Q21I	0.054	-0.005	0.033	0.047	0.059	0.032
Q21J	0.083	0.153	0.164	0.117	0.003	0.138
Q21K	0.097	0.066	0.046	0.056	0.055	0.066
Q21L	0.084	0.006	0.016	0.017	-0.035	-0.019
Q21M	0.139	0.224	0.121	0.078	0.023	0.070
Q21N	0.128	0.222	0.109	0.068	0.043	0.073
Q21O	0.105	0.163	0.147	0.069	-0.014	0.068
Q21P	0.144	0.214	0.180	0.128	0.077	0.160
Q21Q	0.147	0.228	0.097	0.075	0.023	0.054
Q21R	0.117	0.137	0.168	0.084	0.011	0.109
Q21S	0.105	0.167	0.138	0.120	0.074	0.133
Q22A	0.135	0.122	0.151	0.110	0.025	0.140
Q22B	0.037	0.013	0.026	0.112	0.022	0.009
Q22C	0.067	0.068	0.031	0.119	0.030	0.022
Q22D	0.088	0.139	0.089	0.067	0.042	0.063
Q22E	0.054	0.055	0.071	-0.001	-0.018	0.038
Q22F	0.104	0.098	0.063	0.110	0.016	0.063
MSE90	0.031	0.117	-0.025	0.057	0.045	0.043

CORRELATION MATRIX

	IIK	IIL	IIM	IIN	IIO	IIP
IIK	1.000					
IIL	0.540	1.000				
IIM	0.196	0.146	1.000			
IIN	0.118	0.058	0.627	1.000		
IIO	0.044	0.031	0.067	0.051	1.000	
IIP	0.176	0.119	0.242	0.232	0.110	1.000
IIQ	0.250	0.249	0.175	0.120	0.088	0.449
IIR	0.215	0.281	0.145	0.117	0.074	0.361
IIS	0.229	0.255	0.236	0.189	0.120	0.380
IIT	0.260	0.261	0.212	0.154	-0.039	0.419
IIU	0.261	0.221	0.185	0.215	0.032	0.315
IIV	0.263	0.353	0.126	0.116	0.051	0.212
IIW	0.209	0.233	0.199	0.181	0.088	0.270
IIX	0.168	0.162	0.253	0.196	0.223	0.201
NPGMS	-0.066	-0.034	-0.024	-0.062	0.035	0.008
NPEOPLE	-0.037	-0.022	-0.019	-0.009	0.007	-0.024
COLTYPE	0.083	0.031	-0.026	0.026	0.026	0.135
Q12A	-0.006	-0.023	0.045	0.042	0.106	0.039
Q12B	0.011	-0.045	0.054	0.084	0.024	0.040
Q12C	0.042	0.039	0.047	0.068	0.088	0.083
Q12D	0.017	0.034	0.077	0.088	0.139	0.106
Q12E	0.062	0.052	0.054	0.065	0.062	0.176
Q12F	-0.015	-0.016	0.066	0.074	0.102	0.007
Q12G	0.068	0.041	0.079	0.075	0.043	0.049
Q12H	0.012	0.000	0.077	0.090	0.071	0.060
Q12I	-0.004	0.009	0.077	0.080	0.159	0.073
Q12J	0.005	-0.032	0.038	0.069	0.080	0.056
Q12K	0.009	-0.035	0.043	0.056	0.050	0.041
Q12L	-0.005	-0.016	0.033	0.039	-0.001	0.008
Q12M	0.020	-0.003	0.043	0.049	0.080	0.100
Q12N	0.009	-0.015	0.160	0.144	0.233	0.092
Q12O	0.009	0.001	0.086	0.091	0.046	-0.011
COLGPA	0.000	-0.016	0.051	0.023	0.077	-0.019
MSEGPA	0.056	0.051	0.068	0.008	0.133	0.008
Q19A	0.078	0.091	0.025	0.025	0.066	0.218
Q19B	0.025	-0.017	0.148	0.132	0.161	0.113
Q19C	0.056	0.073	0.134	0.104	0.064	0.166
Q19D	0.174	0.104	0.096	0.093	0.074	0.141
Q19E	0.140	0.095	0.086	0.094	0.072	0.135
Q19F	0.091	0.045	0.134	0.074	0.107	0.155
Q19G	0.142	0.078	0.188	0.090	0.415	0.131
Q19H	0.133	0.077	0.147	0.107	0.126	0.241
Q19I	0.066	0.009	0.173	0.100	0.333	0.146
Q19J	0.078	-0.005	0.143	0.097	0.235	0.151
Q19K	0.039	0.056	0.186	0.150	0.224	0.154
Q19L	0.110	0.036	0.131	0.148	0.140	0.274
Q19M	0.040	0.011	0.150	0.163	0.272	0.132
Q19N	0.073	0.027	0.109	0.072	0.127	0.215
Q19O	0.129	0.114	0.085	0.032	0.200	0.185
Q19P	0.111	0.082	0.146	0.154	0.140	0.253
Q19Q	0.110	0.056	0.090	0.125	0.096	0.247
Q19R	0.072	0.031	0.125	0.040	0.317	0.076
Q19S	0.064	0.060	0.148	0.057	0.365	0.116
Q21A	-0.035	-0.044	0.067	0.073	0.171	0.036
Q21B	-0.011	-0.051	0.063	0.098	0.009	0.044
Q21C	-0.001	0.013	0.030	0.041	-0.028	0.036
Q21D	-0.045	0.013	0.127	0.154	-0.051	0.046
Q21E	-0.024	0.025	0.028	0.020	0.090	0.060
Q21F	0.122	0.131	0.089	0.072	0.086	0.156
Q21G	0.104	0.041	0.070	0.061	0.059	0.109
Q21H	0.047	0.052	0.075	0.083	-0.013	0.038

Q21I	0.045	0.049	0.034	0.012	-0.053	0.099
Q21J	0.123	0.083	0.076	0.075	0.035	0.141
Q21K	0.036	0.026	0.073	0.090	0.005	0.046
Q21L	-0.022	-0.026	0.062	0.078	0.066	0.068
Q21M	0.121	0.067	0.153	0.103	0.345	0.110
Q21N	0.125	0.082	0.152	0.108	0.295	0.106
Q21O	0.135	0.093	0.102	0.088	0.171	0.058
Q21P	0.131	0.101	0.156	0.152	0.092	0.174
Q21Q	0.147	0.094	0.154	0.093	0.309	0.105
Q21R	0.109	0.060	0.095	0.101	0.118	0.105
Q21S	0.023	0.015	0.088	0.069	0.152	0.132
Q22A	0.075	0.086	0.115	0.115	0.058	0.122
Q22B	0.041	0.029	0.046	0.035	0.028	0.116
Q22C	0.014	0.036	0.069	0.056	0.104	0.064
Q22D	0.066	0.035	0.059	0.062	0.202	0.019
Q22E	0.072	0.079	0.073	0.073	0.098	0.036
Q22F	0.052	0.039	0.094	0.121	0.048	0.096
MSE90	0.044	0.016	0.061	-0.002	0.272	0.090

CORRELATION MATRIX

	IIQ	IIR	IIS	IIT	IIU	IIV
IIQ	1.000					
IIR	0.719	1.000				
IIS	0.725	0.675	1.000			
IIT	0.497	0.450	0.488	1.000		
IIU	0.417	0.405	0.357	0.486	1.000	
IIV	0.395	0.328	0.386	0.373	0.344	1.000
IIW	0.318	0.311	0.353	0.402	0.401	0.736
IIX	0.320	0.339	0.383	0.249	0.252	0.295
NPGMS	-0.039	0.054	0.032	-0.013	0.014	-0.025
NPEOPLE	-0.043	-0.029	-0.038	-0.008	0.022	-0.018
COLTYPE	0.114	0.161	0.141	0.009	0.055	0.099
Q12A	0.032	0.065	0.099	-0.004	0.001	-0.024
Q12B	0.019	0.029	0.053	0.058	0.010	-0.019
Q12C	0.035	0.060	0.100	0.071	0.088	0.030
Q12D	0.068	0.072	0.138	0.059	0.088	0.045
Q12E	0.149	0.143	0.146	0.127	0.123	0.090
Q12F	0.046	0.031	0.028	0.004	0.020	-0.023
Q12G	0.078	0.091	0.062	0.055	0.049	0.041
Q12H	0.102	0.084	0.084	0.045	0.061	0.046
Q12I	0.053	0.036	0.090	0.020	0.012	0.022
Q12J	0.022	0.070	0.096	0.000	0.019	0.008
Q12K	0.016	-0.018	0.061	0.043	0.048	-0.036
Q12L	-0.024	-0.031	0.030	-0.006	-0.013	-0.045
Q12M	0.104	0.082	0.087	0.067	0.044	0.072
Q12N	0.114	0.078	0.155	0.063	0.084	0.053
Q12O	-0.027	-0.025	0.029	0.014	0.000	-0.029
COLGPA	-0.003	0.070	0.080	-0.069	-0.019	0.051
MSEGPA	-0.018	0.038	0.075	-0.031	-0.010	0.045
Q19A	0.255	0.202	0.154	0.199	0.186	0.159
Q19B	0.031	0.002	0.066	0.050	0.039	0.000
Q19C	0.191	0.170	0.152	0.155	0.121	0.128
Q19D	0.134	0.048	0.078	0.231	0.136	0.126
Q19E	0.113	0.065	0.099	0.172	0.141	0.139
Q19F	0.100	0.034	0.102	0.166	0.081	0.067
Q19G	0.152	0.093	0.231	0.026	0.058	0.108
Q19H	0.338	0.238	0.254	0.197	0.240	0.232
Q19I	0.176	0.172	0.247	0.078	0.097	0.146
Q19J	0.196	0.136	0.256	0.052	0.077	0.152
Q19K	0.202	0.159	0.281	0.118	0.165	0.140
Q19L	0.370	0.321	0.285	0.196	0.245	0.214
Q19M	0.183	0.151	0.229	0.082	0.159	0.087
Q19N	0.146	0.081	0.118	0.074	0.137	0.017

```
     Q19O     0.229      0.146      0.227      0.173      0.121      0.275
     Q19P     0.275      0.249      0.260      0.234      0.201      0.200
     Q19Q     0.316      0.207      0.205      0.217      0.203      0.181
     Q19R     0.127      0.085      0.171      0.066      0.153      0.100
     Q19S     0.187      0.110      0.236      0.092      0.153      0.164
     Q21A     0.027     -0.025      0.035      0.072      0.007      0.014
     Q21B    -0.007     -0.074     -0.006      0.012      0.033     -0.028
     Q21C    -0.049     -0.101     -0.043      0.119     -0.045      0.002
     Q21D    -0.018     -0.010      0.025     -0.045      0.006      0.028
     Q21E     0.016     -0.029     -0.020      0.002      0.031     -0.027
     Q21F     0.198      0.124      0.162      0.155      0.195      0.173
     Q21G     0.141      0.006      0.060      0.067      0.122      0.055
     Q21H     0.065      0.046      0.056      0.056      0.090      0.044
     Q21I     0.053      0.073      0.028      0.094      0.024      0.028
     Q21J     0.258      0.227      0.176      0.127      0.206      0.135
     Q21K     0.045      0.007      0.064      0.063      0.076      0.027
     Q21L     0.025     -0.003      0.021      0.062     -0.046     -0.010
     Q21M     0.166      0.094      0.213      0.069      0.052      0.120
     Q21N     0.155      0.076      0.209      0.046      0.074      0.092
     Q21O     0.105      0.075      0.100      0.053      0.112      0.078
     Q21P     0.233      0.167      0.184      0.130      0.188      0.141
     Q21Q     0.126      0.090      0.219      0.053      0.071      0.120
     Q21R     0.192      0.169      0.204      0.067      0.172      0.114
     Q21S     0.161      0.092      0.172      0.079      0.090      0.083
     Q22A     0.132      0.113      0.116      0.139      0.115      0.230
     Q22B     0.053     -0.019     -0.012      0.163      0.022      0.022
     Q22C     0.063     -0.034      0.017      0.070      0.069     -0.009
     Q22D     0.073      0.080      0.095     -0.004      0.039      0.057
     Q22E    -0.002      0.038      0.054      0.019     -0.041      0.064
     Q22F     0.055      0.058      0.043      0.067      0.032      0.055
    MSE90     0.133      0.050      0.128      0.052      0.054      0.097

          CORRELATION MATRIX
                IIW        IIX      NPGMS    NPEOPLE    COLTYPE       Q12A
              ________   ________   ________   ________   ________   ________
      IIW     1.000
      IIX     0.348      1.000
    NPGMS     0.017      0.067      1.000
  NPEOPLE     0.006      0.024      0.109      1.000
  COLTYPE     0.053      0.139      0.061     -0.002      1.000
     Q12A    -0.003      0.063      0.016      0.014      0.073      1.000
     Q12B    -0.006      0.014     -0.026      0.035      0.288      0.257
     Q12C     0.069      0.040     -0.003     -0.005      0.120      0.371
     Q12D     0.054      0.079      0.008      0.014      0.182      0.444
     Q12E     0.138      0.065     -0.007     -0.014      0.157      0.282
     Q12F     0.002      0.046     -0.028     -0.018      0.114      0.288
     Q12G     0.041      0.056     -0.040     -0.047      0.231      0.218
     Q12H     0.031      0.071     -0.007      0.003      0.310      0.406
     Q12I     0.010      0.058     -0.006      0.018      0.113      0.498
     Q12J    -0.003      0.042      0.004      0.013     -0.026      0.777
     Q12K    -0.010     -0.001     -0.020      0.016      0.287      0.161
     Q12L    -0.029     -0.009      0.030      0.003     -0.328      0.082
     Q12M     0.047      0.012     -0.019     -0.003      0.359      0.328
     Q12N     0.046      0.070     -0.020      0.015      0.131      0.319
     Q12O    -0.021      0.027     -0.056     -0.004     -0.119      0.233
   COLGPA     0.008      0.103      0.029      0.002     -0.015      0.237
   MSEGPA     0.019      0.070      0.001     -0.001     -0.045      0.190
     Q19A     0.131      0.069     -0.035      0.005      0.038      0.020
     Q19B     0.097      0.107      0.012     -0.012     -0.061      0.103
     Q19C     0.146      0.084     -0.013      0.049      0.146      0.001
     Q19D     0.155      0.095     -0.066      0.014     -0.014      0.021
     Q19E     0.170      0.095     -0.025      0.030      0.048      0.035
     Q19F     0.097      0.106      0.070      0.013      0.036      0.073
     Q19G     0.103      0.237     -0.012      0.004      0.097      0.059
```

Q19H	0.195	0.148	-0.025	0.025	0.212	0.010
Q19I	0.128	0.224	0.036	0.004	0.179	0.158
Q19J	0.136	0.209	0.015	0.042	-0.008	0.115
Q19K	0.148	0.240	0.014	0.061	0.083	0.107
Q19L	0.240	0.158	0.018	0.005	0.118	0.048
Q19M	0.110	0.161	-0.001	0.026	0.099	0.159
Q19N	0.086	0.064	-0.007	0.015	0.196	0.114
Q19O	0.204	0.143	0.001	0.019	0.176	0.026
Q19P	0.214	0.160	0.015	-0.011	0.119	0.087
Q19Q	0.184	0.078	-0.042	-0.003	0.161	0.028
Q19R	0.125	0.143	-0.033	-0.003	-0.031	0.104
Q19S	0.122	0.158	-0.022	0.014	0.043	0.027
Q21A	0.010	0.034	-0.076	0.015	-0.157	0.017
Q21B	-0.023	-0.043	-0.060	0.069	-0.049	0.006
Q21C	-0.002	-0.038	-0.001	0.024	-0.058	-0.055
Q21D	0.025	0.015	-0.035	0.012	-0.038	0.031
Q21E	0.041	-0.095	-0.004	0.000	0.042	0.001
Q21F	0.136	0.122	0.009	-0.018	0.131	0.039
Q21G	0.057	0.005	0.005	0.012	-0.008	-0.033
Q21H	0.042	-0.024	-0.022	-0.019	0.044	0.017
Q21I	0.025	0.076	0.026	-0.028	0.028	-0.082
Q21J	0.118	0.168	0.017	-0.008	0.190	0.043
Q21K	0.018	0.015	-0.012	0.028	-0.011	0.049
Q21L	-0.007	0.041	0.039	0.047	-0.022	0.010
Q21M	0.090	0.308	-0.013	0.027	0.098	0.023
Q21N	0.076	0.298	-0.030	0.020	0.051	0.057
Q21O	0.095	0.196	-0.006	0.006	0.030	0.034
Q21P	0.149	0.155	-0.050	0.018	0.014	0.047
Q21Q	0.091	0.313	-0.006	0.035	0.031	0.005
Q21R	0.103	0.197	0.010	0.003	0.115	0.075
Q21S	0.129	0.108	-0.011	0.012	-0.005	0.068
Q22A	0.168	0.086	-0.012	-0.037	0.110	0.003
Q22B	0.008	-0.061	-0.042	0.003	0.035	-0.049
Q22C	0.010	-0.084	0.001	0.044	-0.012	0.010
Q22D	0.090	0.078	-0.022	0.016	0.070	0.157
Q22E	0.056	0.109	-0.015	0.025	0.002	0.002
Q22F	0.075	-0.004	-0.054	-0.020	0.015	0.026
MSE90	0.040	0.127	-0.013	-0.016	0.165	-0.028

CORRELATION MATRIX

	Q12B	Q12C	Q12D	Q12E	Q12F	Q12G
Q12B	1.000					
Q12C	0.275	1.000				
Q12D	0.275	0.681	1.000			
Q12E	0.203	0.366	0.346	1.000		
Q12F	0.258	0.197	0.258	0.272	1.000	
Q12G	0.452	0.138	0.232	0.241	0.406	1.000
Q12H	0.402	0.299	0.439	0.285	0.447	0.513
Q12I	0.291	0.363	0.447	0.302	0.403	0.341
Q12J	0.254	0.363	0.435	0.297	0.352	0.267
Q12K	0.346	0.158	0.214	0.201	0.472	0.354
Q12L	0.105	0.094	0.080	0.110	0.102	0.045
Q12M	0.302	0.214	0.316	0.248	0.410	0.323
Q12N	0.196	0.256	0.329	0.268	0.336	0.216
Q12O	0.366	0.182	0.237	0.183	0.083	0.253
COLGPA	0.023	0.309	0.304	0.138	-0.035	0.025
MSEGPA	0.017	0.275	0.258	0.117	-0.051	-0.049
Q19A	-0.016	0.049	0.064	0.147	0.010	0.016
Q19B	0.076	0.144	0.091	0.120	0.033	0.010
Q19C	0.041	0.053	0.039	0.148	0.133	0.040
Q19D	0.073	0.132	0.092	0.096	0.048	0.028
Q19E	0.118	0.069	0.059	0.111	0.112	0.067
Q19F	0.077	0.076	0.076	0.106	0.115	0.044

Q19G	0.032	0.068	0.088	0.074	0.001	-0.028
Q19H	0.041	0.023	0.066	0.161	0.059	0.099
Q19I	0.051	0.102	0.115	0.136	0.069	0.023
Q19J	0.046	0.077	0.093	0.141	0.078	0.052
Q19K	0.086	0.108	0.150	0.117	0.014	0.057
Q19L	0.080	0.092	0.118	0.197	0.074	0.126
Q19M	0.066	0.216	0.319	0.143	0.101	0.050
Q19N	0.087	0.135	0.133	0.172	0.068	0.069
Q19O	0.050	0.123	0.092	0.227	0.028	0.049
Q19P	0.067	0.108	0.100	0.278	0.128	0.162
Q19Q	0.096	0.052	0.064	0.242	0.105	0.138
Q19R	-0.025	0.126	0.122	0.135	0.039	-0.043
Q19S	-0.016	0.078	0.093	0.096	-0.007	-0.073
Q21A	0.123	0.059	0.066	0.034	0.023	0.017
Q21B	0.046	0.014	0.057	0.036	0.067	-0.026
Q21C	0.046	0.006	0.006	-0.008	-0.028	-0.046
Q21D	0.138	0.031	0.093	-0.027	0.078	0.119
Q21E	0.039	0.057	0.064	0.073	0.019	0.016
Q21F	0.063	0.095	0.141	0.109	0.057	0.089
Q21G	-0.007	-0.004	0.050	0.077	0.043	-0.058
Q21H	0.015	0.082	0.093	0.084	0.097	-0.011
Q21I	-0.075	-0.036	-0.045	-0.044	-0.079	0.002
Q21J	-0.068	0.046	0.100	0.092	0.050	0.132
Q21K	0.069	0.086	0.123	0.084	0.073	0.047
Q21L	0.066	0.047	0.079	-0.001	0.040	0.019
Q21M	0.020	0.074	0.128	0.076	0.032	-0.006
Q21N	0.035	0.096	0.124	0.057	0.022	0.031
Q21O	0.063	0.072	0.116	0.029	0.017	0.127
Q21P	0.050	0.095	0.158	0.105	0.065	0.139
Q21Q	0.017	0.079	0.115	0.061	0.022	0.011
Q21R	0.063	0.106	0.135	0.116	0.069	0.101
Q21S	0.078	0.145	0.211	0.135	0.058	0.069
Q22A	0.065	0.143	0.081	0.158	0.017	0.056
Q22B	0.015	0.043	0.032	0.051	-0.042	-0.065
Q22C	0.014	0.076	0.085	0.119	0.005	-0.060
Q22D	0.092	0.061	0.121	0.045	0.105	0.157
Q22E	0.058	0.052	0.063	0.044	0.038	0.088
Q22F	0.117	0.113	0.126	0.104	0.083	0.114
MSE90	-0.018	0.042	0.043	0.022	-0.049	-0.094

CORRELATION MATRIX

	Q12H	Q12I	Q12J	Q12K	Q12L	Q12M
Q12H	1.000					
Q12I	0.573	1.000				
Q12J	0.466	0.636	1.000			
Q12K	0.331	0.355	0.264	1.000		
Q12L	-0.038	0.105	0.110	0.154	1.000	
Q12M	0.571	0.402	0.374	0.394	-0.008	1.000
Q12N	0.389	0.529	0.387	0.330	0.113	0.463
Q12O	0.230	0.255	0.269	0.112	0.236	0.143
COLGPA	0.019	0.116	0.190	-0.055	0.076	-0.068
MSEGPA	-0.029	0.135	0.160	-0.063	0.103	-0.076
Q19A	0.079	0.054	0.007	0.009	0.001	0.120
Q19B	0.074	0.120	0.113	0.006	0.032	0.068
Q19C	0.110	0.027	0.016	0.069	-0.028	0.119
Q19D	0.080	0.076	0.053	0.060	0.081	0.026
Q19E	0.082	0.077	0.079	0.117	0.080	0.060
Q19F	0.099	0.095	0.063	0.075	-0.024	0.072
Q19G	0.066	0.134	0.051	0.050	0.044	0.077
Q19H	0.151	0.096	0.011	0.062	-0.010	0.158
Q19I	0.151	0.166	0.159	0.050	0.019	0.131
Q19J	0.116	0.138	0.105	0.070	0.052	0.105
Q19K	0.132	0.143	0.118	0.059	0.037	0.131

```
        Q19L      0.157      0.097      0.045      0.097      0.003      0.153
        Q19M      0.164      0.175      0.134      0.087      0.014      0.102
        Q19N      0.096      0.157      0.110      0.048      0.099      0.104
        Q19O      0.099      0.120      0.047      0.028      0.005      0.121
        Q19P      0.163      0.147      0.113      0.112      0.036      0.175
        Q19Q      0.146      0.129      0.044      0.084     -0.008      0.182
        Q19R      0.049      0.159      0.112     -0.003      0.097      0.067
        Q19S      0.044      0.134      0.028     -0.002      0.074      0.084
        Q21A      0.068      0.058      0.027     -0.010     -0.022      0.059
        Q21B      0.013      0.057      0.051      0.051      0.070      0.062
        Q21C     -0.011      0.008     -0.062     -0.011      0.047      0.036
        Q21D      0.111      0.058      0.025      0.125     -0.052      0.119
        Q21E      0.068      0.073     -0.012      0.007      0.047      0.104
        Q21F      0.122      0.058      0.070      0.071     -0.005      0.139
        Q21G      0.030     -0.008     -0.013      0.044      0.017      0.109
        Q21H      0.047      0.076      0.047      0.036      0.018      0.079
        Q21I     -0.089     -0.100     -0.090     -0.066      0.013     -0.105
        Q21J      0.088      0.016      0.041      0.003     -0.084      0.099
        Q21K      0.080      0.074      0.075      0.052      0.004      0.116
        Q21L      0.052      0.017      0.005      0.038     -0.018      0.086
        Q21M      0.046      0.097      0.024      0.022      0.046      0.049
        Q21N      0.062      0.125      0.057      0.027      0.032      0.033
        Q21O      0.079      0.049      0.036      0.007     -0.038      0.045
        Q21P      0.098      0.050      0.047      0.034     -0.032      0.091
        Q21Q      0.048      0.093      0.024      0.006      0.025      0.029
        Q21R      0.121      0.060      0.114      0.054     -0.032      0.072
        Q21S      0.111      0.125      0.127      0.082      0.017      0.128
        Q22A      0.072      0.083      0.043      0.044     -0.025      0.080
        Q22B      0.008      0.035     -0.037     -0.014      0.017      0.048
        Q22C      0.050      0.064      0.035      0.001      0.042      0.066
        Q22D      0.187      0.139      0.125      0.062     -0.066      0.137
        Q22E      0.085      0.040      0.035      0.042     -0.049      0.054
        Q22F      0.089      0.058      0.028      0.083     -0.033      0.060
       MSE90     -0.053      0.013     -0.051     -0.056      0.028      0.006

          CORRELATION MATRIX
                  Q12N       Q12O     COLGPA     MSEGPA       Q19A       Q19B
                ________   ________   ________   ________   ________   ________
        Q12N      1.000
        Q12O      0.246      1.000
      COLGPA      0.035      0.159      1.000
      MSEGPA      0.108      0.172      0.779      1.000
        Q19A      0.147     -0.035     -0.044      0.058      1.000
        Q19B      0.249      0.122      0.095      0.174      0.118      1.000
        Q19C      0.145     -0.061     -0.169     -0.134      0.249      0.254
        Q19D      0.188      0.090     -0.005      0.085      0.219      0.282
        Q19E      0.134      0.079     -0.048      0.039      0.205      0.293
        Q19F      0.198      0.043     -0.012      0.044      0.122      0.219
        Q19G      0.482      0.127      0.131      0.268      0.246      0.487
        Q19H      0.274      0.061     -0.034      0.034      0.374      0.190
        Q19I      0.496      0.133      0.142      0.218      0.242      0.425
        Q19J      0.334      0.075      0.063      0.106      0.163      0.265
        Q19K      0.331      0.128      0.121      0.172      0.210      0.328
        Q19L      0.241      0.063     -0.010      0.024      0.311      0.187
        Q19M      0.395      0.043      0.178      0.193      0.255      0.380
        Q19N      0.154      0.020      0.069      0.130      0.160      0.168
        Q19O      0.309      0.074      0.098      0.159      0.274      0.266
        Q19P      0.225      0.062      0.030      0.038      0.269      0.191
        Q19Q      0.206      0.044     -0.045     -0.017      0.383      0.141
        Q19R      0.465      0.116      0.176      0.322      0.170      0.360
        Q19S      0.470      0.091      0.106      0.265      0.231      0.401
        Q21A      0.071      0.102      0.073      0.070      0.030      0.123
        Q21B      0.053      0.103      0.037      0.027     -0.004      0.061
        Q21C      0.030      0.041     -0.084      0.003      0.033      0.043
```

Q21D	0.080	0.104	0.031	-0.008	0.016	0.036
Q21E	0.168	0.087	-0.038	0.035	0.024	0.135
Q21F	0.101	0.011	0.001	0.001	0.164	0.044
Q21G	0.058	-0.016	-0.086	-0.024	0.146	0.061
Q21H	0.105	0.057	0.093	0.116	0.031	0.103
Q21I	-0.120	-0.084	-0.012	-0.033	0.032	-0.052
Q21J	0.034	-0.124	0.051	0.002	0.185	0.035
Q21K	0.086	0.059	0.022	0.031	0.036	0.037
Q21L	0.059	0.053	0.035	0.026	0.042	0.024
Q21M	0.295	0.100	0.106	0.215	0.168	0.229
Q21N	0.246	0.114	0.093	0.205	0.115	0.228
Q21O	0.039	0.048	0.046	0.054	0.034	0.105
Q21P	0.105	-0.024	0.062	0.037	0.119	0.097
Q21Q	0.256	0.102	0.117	0.227	0.154	0.223
Q21R	0.067	0.037	0.126	0.068	0.078	0.078
Q21S	0.133	0.033	0.114	0.104	0.062	0.052
Q22A	0.129	0.025	0.030	0.065	0.091	0.113
Q22B	0.099	0.068	-0.086	0.003	0.118	0.131
Q22C	0.208	0.081	-0.053	0.027	0.056	0.169
Q22D	0.142	0.057	0.072	0.066	0.009	0.040
Q22E	0.034	0.032	0.045	0.029	-0.040	0.057
Q22F	0.062	0.107	0.029	0.035	0.016	0.126
MSE90	0.281	0.078	0.179	0.277	0.194	0.285

CORRELATION MATRIX

	Q19C	Q19D	Q19E	Q19F	Q19G	Q19H
Q19C	1.000					
Q19D	0.316	1.000				
Q19E	0.351	0.458	1.000			
Q19F	0.145	0.314	0.298	1.000		
Q19G	0.226	0.260	0.188	0.307	1.000	
Q19H	0.329	0.272	0.268	0.202	0.447	1.000
Q19I	0.252	0.192	0.248	0.326	0.750	0.503
Q19J	0.181	0.159	0.168	0.297	0.495	0.292
Q19K	0.271	0.223	0.244	0.252	0.534	0.429
Q19L	0.329	0.227	0.294	0.189	0.347	0.619
Q19M	0.239	0.215	0.252	0.256	0.595	0.398
Q19N	0.122	0.122	0.113	0.110	0.217	0.241
Q19O	0.235	0.296	0.259	0.261	0.529	0.348
Q19P	0.328	0.254	0.309	0.209	0.294	0.390
Q19Q	0.339	0.279	0.277	0.142	0.265	0.539
Q19R	0.172	0.291	0.227	0.233	0.715	0.335
Q19S	0.213	0.287	0.193	0.224	0.783	0.433
Q21A	0.089	0.083	0.068	0.010	0.050	0.051
Q21B	0.040	0.060	0.045	0.009	0.028	0.081
Q21C	0.023	0.065	0.065	0.065	0.001	0.044
Q21D	0.091	0.007	0.001	-0.020	-0.008	0.109
Q21E	0.093	0.131	0.107	0.101	0.112	0.149
Q21F	0.169	0.065	0.145	0.051	0.065	0.193
Q21G	0.139	0.088	0.123	0.093	0.107	0.234
Q21H	0.040	0.010	0.077	0.022	0.068	0.073
Q21I	-0.019	0.019	0.003	0.030	-0.068	-0.029
Q21J	0.128	0.021	0.030	0.009	0.052	0.205
Q21K	0.040	0.049	0.014	0.002	0.041	0.078
Q21L	0.048	0.028	0.029	0.062	0.039	0.017
Q21M	0.103	0.177	0.138	0.185	0.576	0.294
Q21N	0.073	0.151	0.155	0.131	0.520	0.240
Q21O	0.085	0.070	0.106	-0.014	0.137	0.106
Q21P	0.121	0.009	0.080	0.002	0.114	0.148
Q21Q	0.106	0.160	0.155	0.176	0.554	0.254
Q21R	0.088	0.038	0.070	-0.001	0.075	0.179
Q21S	0.092	0.064	0.068	-0.005	0.022	0.149
Q22A	0.066	0.119	0.068	0.085	0.064	0.147

```
   Q22B       0.074       0.113       0.119       0.146       0.081       0.122
   Q22C       0.115       0.133       0.123       0.116       0.180       0.219
   Q22D       0.044      -0.020      -0.046       0.050       0.079       0.100
   Q22E       0.015      -0.004       0.038       0.052       0.027       0.001
   Q22F       0.060       0.063       0.039       0.019      -0.027       0.042
  MSE90       0.142       0.127       0.114       0.181       0.636       0.318

        CORRELATION MATRIX
                   Q19I        Q19J        Q19K        Q19L        Q19M        Q19N
               __________  __________  __________  __________  __________  __________
   Q19I       1.000
   Q19J       0.616       1.000
   Q19K       0.611       0.689       1.000
   Q19L       0.455       0.364       0.492       1.000
   Q19M       0.623       0.458       0.504       0.465       1.000
   Q19N       0.259       0.216       0.254       0.300       0.381       1.000
   Q19O       0.513       0.414       0.426       0.347       0.448       0.357
   Q19P       0.370       0.325       0.385       0.451       0.389       0.272
   Q19Q       0.299       0.207       0.320       0.623       0.298       0.283
   Q19R       0.623       0.425       0.435       0.342       0.609       0.258
   Q19S       0.700       0.502       0.534       0.416       0.626       0.264
   Q21A       0.074       0.068       0.074       0.017       0.063      -0.009
   Q21B       0.047      -0.012       0.066       0.041       0.094       0.041
   Q21C      -0.007      -0.007      -0.073       0.054      -0.094      -0.057
   Q21D       0.034       0.008       0.036       0.035       0.096      -0.032
   Q21E       0.100       0.101       0.151       0.138       0.101       0.073
   Q21F       0.050       0.037       0.080       0.151       0.084       0.136
   Q21G       0.083       0.059       0.053       0.173       0.164       0.176
   Q21H       0.095      -0.024       0.027       0.070       0.029       0.042
   Q21I      -0.100      -0.079      -0.096      -0.032      -0.046      -0.014
   Q21J       0.073       0.072       0.108       0.194       0.192       0.175
   Q21K       0.043      -0.022       0.047       0.088       0.055       0.007
   Q21L       0.055       0.029       0.047       0.072       0.032      -0.026
   Q21M       0.494       0.366       0.353       0.210       0.420       0.174
   Q21N       0.449       0.357       0.346       0.187       0.403       0.131
   Q21O       0.096       0.074       0.134       0.104       0.204       0.082
   Q21P       0.124       0.073       0.103       0.192       0.202       0.114
   Q21Q       0.475       0.334       0.362       0.208       0.407       0.137
   Q21R       0.165       0.134       0.163       0.162       0.215       0.130
   Q21S       0.083       0.072       0.112       0.151       0.133       0.063
   Q22A       0.049       0.097       0.110       0.113       0.076       0.089
   Q22B       0.070       0.076       0.008       0.111       0.045       0.052
   Q22C       0.220       0.119       0.119       0.169       0.184       0.105
   Q22D       0.096       0.134       0.133       0.100       0.189       0.105
   Q22E       0.049       0.047       0.054      -0.008       0.066       0.044
   Q22F       0.077       0.017       0.098       0.142       0.083       0.059
  MSE90       0.541       0.376       0.373       0.201       0.427       0.146

        CORRELATION MATRIX
                   Q19O        Q19P        Q19Q        Q19R        Q19S        Q21A
               __________  __________  __________  __________  __________  __________
   Q19O       1.000
   Q19P       0.461       1.000
   Q19Q       0.355       0.503       1.000
   Q19R       0.485       0.292       0.291       1.000
   Q19S       0.559       0.320       0.304       0.867       1.000
   Q21A       0.042       0.063       0.039       0.121       0.071       1.000
   Q21B       0.040       0.097       0.054       0.113       0.055       0.249
   Q21C       0.052       0.054       0.083      -0.011       0.035       0.356
   Q21D       0.066       0.064       0.064       0.013      -0.041       0.089
   Q21E       0.122       0.206       0.155       0.088       0.156       0.435
   Q21F       0.128       0.163       0.160       0.042       0.078       0.168
   Q21G       0.112       0.128       0.170       0.150       0.107       0.228
   Q21H       0.083       0.106       0.071       0.055       0.081       0.058
  Q21I    -0.061     -0.050     -0.013     -0.071     -0.071     -0.035
  Q21J     0.077      0.127      0.181      0.065      0.050      0.021
  Q21K     0.038      0.075      0.059      0.082      0.035      0.118
  Q21L     0.049      0.058      0.058      0.023      0.042      0.219
  Q21M     0.324      0.178      0.137      0.598      0.622      0.176
  Q21N     0.251      0.130      0.132      0.565      0.562      0.191
  Q21O     0.107      0.069      0.093      0.159      0.119      0.078
  Q21P     0.093      0.157      0.110      0.127      0.075      0.091
  Q21Q     0.308      0.150      0.128      0.582      0.594      0.199
  Q21R     0.068      0.141      0.099      0.130      0.113      0.145
  Q21S     0.093      0.176      0.091      0.129      0.069      0.463
  Q22A     0.218      0.170      0.108      0.106      0.118      0.121
  Q22B     0.126      0.132      0.122      0.075      0.110      0.305
  Q22C     0.170      0.202      0.154      0.246      0.233      0.383
  Q22D     0.035      0.108      0.032      0.051      0.061      0.288
  Q22E     0.044      0.062      0.015      0.029      0.000      0.233
  Q22F     0.040      0.095      0.094     -0.051     -0.039      0.146
 MSE90     0.385      0.182      0.158      0.651      0.688      0.092

      CORRELATION MATRIX
              Q21B       Q21C       Q21D       Q21E       Q21F       Q21G
          ________   ________   ________   ________   ________   ________
  Q21B     1.000
  Q21C     0.127      1.000
  Q21D     0.307      0.017      1.000
  Q21E     0.274      0.415      0.155      1.000
  Q21F     0.090      0.137      0.130      0.181      1.000
  Q21G     0.441      0.183      0.154      0.340      0.354      1.000
  Q21H     0.269      0.152      0.150      0.222      0.177      0.285
  Q21I    -0.137      0.042     -0.045     -0.115      0.020     -0.010
  Q21J     0.056     -0.165      0.124     -0.023      0.431      0.261
  Q21K     0.711      0.056      0.215      0.235      0.163      0.475
  Q21L     0.279      0.279      0.217      0.245      0.040      0.112
  Q21M     0.025      0.089      0.040      0.181      0.218      0.223
  Q21N    -0.001      0.064      0.066      0.155      0.222      0.202
  Q21O     0.126     -0.059      0.163      0.016      0.229      0.223
  Q21P     0.168     -0.086      0.143      0.017      0.405      0.290
  Q21Q    -0.010      0.085      0.044      0.095      0.191      0.171
  Q21R     0.096     -0.096      0.169      0.102      0.436      0.209
  Q21S     0.175      0.153      0.161      0.298      0.347      0.301
  Q22A    -0.026      0.043      0.085      0.132      0.119      0.118
  Q22B     0.090      0.612     -0.062      0.461      0.088      0.242
  Q22C     0.236      0.389     -0.015      0.669      0.070      0.358
  Q22D     0.115     -0.100      0.118      0.112      0.171      0.179
  Q22E    -0.030      0.069      0.074      0.035      0.220      0.075
  Q22F     0.154      0.056      0.324      0.192      0.165      0.179
 MSE90     0.060      0.027     -0.012      0.107      0.041      0.100

      CORRELATION MATRIX
              Q21H       Q21I       Q21J       Q21K       Q21L       Q21M
          ________   ________   ________   ________   ________   ________
  Q21H     1.000
  Q21I    -0.143      1.000
  Q21J     0.140      0.168      1.000
  Q21K     0.284     -0.023      0.175      1.000
  Q21L     0.154      0.032      0.067      0.308      1.000
  Q21M     0.071      0.039      0.199      0.017      0.110      1.000
  Q21N     0.069      0.016      0.198      0.024      0.092      0.851
  Q21O     0.106      0.052      0.337      0.224      0.159      0.359
  Q21P     0.169      0.032      0.422      0.282      0.078      0.222
  Q21Q     0.035      0.063      0.188     -0.009      0.060      0.857
  Q21R     0.135      0.013      0.521      0.142      0.014      0.288
  Q21S     0.099      0.091      0.192      0.177      0.191      0.270
  Q22A     0.138      0.052      0.116      0.064      0.043      0.131
  Q22B       0.130      0.062     -0.083      0.085      0.269      0.132
  Q22C       0.208     -0.091     -0.077      0.200      0.236      0.196
  Q22D       0.050      0.067      0.258      0.060      0.113      0.226
  Q22E       0.067      0.080      0.188      0.031      0.257      0.135
  Q22F       0.181      0.049      0.199      0.180      0.291      0.053
 MSE90       0.078     -0.029      0.022      0.008      0.007      0.504

     CORRELATION MATRIX
                  Q21N       Q21O       Q21P       Q21Q       Q21R       Q21S
             ---------- ---------- ---------- ---------- ---------- ----------
  Q21N       1.000
  Q21O       0.410      1.000
  Q21P       0.236      0.419      1.000
  Q21Q       0.838      0.376      0.234      1.000
  Q21R       0.306      0.377      0.468      0.276      1.000
  Q21S       0.241      0.254      0.335      0.256      0.440      1.000
  Q22A       0.181      0.164      0.181      0.150      0.119      0.167
  Q22B       0.111     -0.017      0.000      0.120     -0.042      0.223
  Q22C       0.142      0.016      0.018      0.122      0.039      0.280
  Q22D       0.226      0.203      0.198      0.248      0.273      0.313
  Q22E       0.142      0.199      0.166      0.143      0.180      0.189
  Q22F       0.030      0.232      0.234      0.032      0.249      0.244
 MSE90       0.420      0.053     -0.003      0.487     -0.007      0.055

     CORRELATION MATRIX
                  Q22A       Q22B       Q22C       Q22D       Q22E       Q22F
             ---------- ---------- ---------- ---------- ---------- ----------
  Q22A       1.000
  Q22B       0.209      1.000
  Q22C       0.203      0.651      1.000
  Q22D       0.132     -0.004      0.228      1.000
  Q22E       0.158      0.114      0.075      0.416      1.000
  Q22F       0.201      0.155      0.193      0.384      0.381      1.000
 MSE90       0.096      0.115      0.195      0.068     -0.028     -0.022

     CORRELATION MATRIX
                 MSE90
             ----------
 MSE90       1.000
```

APPENDIX C

LISREL Computer Output for Best-Fitting Model

```
                              DATE:  3/10/95
                               TIME: 11:38

                         WINDOWS  L I S R E L  8.10

                                    BY

                       KARL G JORESKOG AND DAG SORBOM



                   This program is published exclusively by
                   Scientific Software International, Inc.
                      1525 East 53rd Street - Suite 530
                       Chicago, Illinois 60615, U.S.A.
            Voice: (800)247-6113, (312)684-4920, Fax: (312)684-4979
         Copyright by Scientific Software International, Inc., 1981-93.
  Partial copyright by WATCOM Group, Inc., 1993 and MicroHelp, Inc., 1993.
       Use of this program is subject to the terms specified in the
                       Universal Copyright Convention.

 The following lines were read from file C:\NSFPATH\BIGMODEL\BASIC14.SPL:

 BASIC14.SPL, DIRECT AND INDIRECT EFFECTS ON PERSISTENCE IN
SCIENCE/ENGINEERING
 OBSERVED VARIABLES: SEX SATV SATM TSWE GPA RANK
 ENGLGRD MATHGRD LANGGRD BIOGRD
 PHYSGRD SOCGRD
 HENGL HMATH HLANG HBIOL HPHYS
 HSOC ADVENG ADVMATH ADVLANG
 ADVBIOL ADVPHYS ADVSOC ADVARTM
 NADVSCI NADVNSCI NADVTOT
 HRSWORK COMMSERV ATHLETIC CLUBS
 AWARDS ASPIR ETHNIC FATHEDUC
 MOTHEDUC INCOME
 ATHPART ETHPART JOURN ARTMUSIC
 DEPTCLUB RELIG SOCCLUB STUDGOVT
 ACTABIL ARTABIL ATHLABIL CWRITABL
 OTHRABIL LEADABIL MATHABIL MECHABIL
 MUSABIL ORGABIL SALEABIL SCIABIL
 SPEAKABL WRITABIL MVDIF
 IA IB IC ID IE
 IF IG IH II IJ IK IL
 IM IIA IIB IIC IID IIE
 IIF IIG IIH III IIJ IIK
 IIL IIM IIN IIO IIP IIQ
 IIR IIS IIT IIU IIV IIW
 IIX NPGMS NPEOPLE COLTYPE
 Q12A Q12B Q12C Q12D
 Q12E Q12F Q12G Q12H Q12I
 Q12J Q12K Q12L Q12M Q12N
 Q12O COLGPA MSEGPA
 Q19A Q19B Q19C Q19D Q19E
 Q19F Q19G Q19H Q19I Q19J
 Q19K Q19L Q19M Q19N Q19O
 Q19P Q19Q Q19R Q19S
 Q21A Q21B Q21C Q21D Q21E
 Q21F Q21G Q21H Q21I Q21J
 Q21K Q21L Q21M Q21N Q21O Q21P
 Q21Q Q21R Q21S Q22A Q22B Q22C
 Q22D Q22E Q22F MSE90
 CORRELATION MATRIX FROM FILE ALLVARS.COR
 SAMPLE SIZE 2200
 LATENT VARIABLES:  Gender Ses MSciAch Social TypeCol ColMin ColSciGd SciAmbit
Commit Service Security Outcome
 PATHS
 Gender -> SEX
 Ses -> FATHEDUC MOTHEDUC INCOME
 TypeCol -> COLTYPE
 MSciAch -> SATM MATHGRD BIOGRD PHYSGRD
 Social -> LEADABIL SPEAKABL STUDGOVT COMMSERV OTHRABIL CLUBS
 Service -> Q21F Q21J Q21P Q21R
 ColMin  -> Q19H Q19L Q19Q
 Commit -> Q19R Q19S
 SciAmbit -> Q21M Q21N Q21Q
 ColSciGd -> MSEGPA
 Security -> Q21A Q21E Q22C
 Outcome -> MSE90
 Gender -> MSciAch Social TypeCol ColMin SciAmbit Commit ColSciGd Service
Security Outcome
 Ses -> MSciAch Social TypeCol ColMin SciAmbit Commit ColSciGd Service
Security Outcome
 MSciAch -> TypeCol ColMin SciAmbit Commit ColSciGd Service Security Outcome
 Social -> TypeCol ColMin SciAmbit Commit ColSciGd Service Security Outcome
 ColMin -> SciAmbit Commit ColSciGd Service Security Outcome
 Commit -> Outcome
 SciAmbit -> Commit Outcome
 ColSciGd -> Commit Outcome
 Security -> Commit Outcome
 Service -> Commit Outcome
 TypeCol -> ColMin ColSciGd SciAmbit Commit Service Security Outcome
 SET THE ERROR VARIANCE OF SEX TO 0.05
 SET THE ERROR VARIANCE OF MSEGPA TO 0.1
 SET THE ERROR VARIANCE OF MSE90 TO 0.05
 SET THE ERROR VARIANCE OF COLTYPE TO .05
 SET THE ERROR COVARIANCE BETWEEN CLUBS AND STUDGOVT FREE
 PATH DIAGRAM
 END OF PROBLEM

 Sample Size =  2200

 BASIC14.SPL, DIRECT AND INDIRECT EFFECTS ON PERSISTENCE IN
SCIENCE/ENGINEERING

         CORRELATION MATRIX TO BE ANALYZED

                 SATM    MATHGRD     BIOGRD    PHYSGRD   COMMSERV      CLUBS
             --------   --------   --------   --------   --------   --------
     SATM        1.00
  MATHGRD        0.26       1.00
   BIOGRD        0.20       0.43       1.00
  PHYSGRD        0.30       0.54       0.55       1.00
 COMMSERV       -0.06       0.06       0.11       0.05       1.00
    CLUBS        0.08       0.20       0.30       0.25       0.32       1.00
 STUDGOVT        0.01       0.15       0.18       0.15       0.23       0.66
 OTHRABIL       -0.07       0.01       0.04       0.04       0.21       0.22
 LEADABIL        0.02       0.13       0.16       0.16       0.27       0.45
 SPEAKABL        0.06       0.07       0.18       0.14       0.22       0.28
  COLTYPE        0.17       0.25       0.22       0.24       0.06       0.24
   MSEGPA        0.19       0.28       0.22       0.28       0.01       0.03
     Q19H       -0.07       0.05       0.04       0.03       0.14       0.10
     Q19L       -0.09       0.00      -0.02       0.02       0.09       0.10
     Q19Q       -0.05       0.00       0.00       0.02       0.02       0.03
     Q19R        0.06       0.12       0.12       0.15       0.04      -0.03
     Q19S        0.09       0.13       0.11       0.16       0.07      -0.01
     Q21A       -0.06      -0.04      -0.03       0.00       0.12       0.02
     Q21E     -0.08      0.05     -0.07     -0.06     -0.01     -0.07
     Q21F     -0.10      0.05      0.03      0.08      0.22      0.17
     Q21J     -0.08      0.00      0.08      0.01      0.18      0.15
     Q21M      0.04      0.09      0.09      0.13      0.05      0.03
     Q21N      0.04      0.06      0.05      0.11      0.01     -0.01
     Q21P     -0.06     -0.01      0.03      0.06      0.14      0.11
     Q21Q      0.04      0.06      0.08      0.12      0.01      0.01
     Q21R     -0.05      0.07      0.10      0.10      0.16      0.15
     Q22C     -0.13     -0.01     -0.08     -0.05      0.01     -0.08
    MSE90      0.15      0.13      0.09      0.15      0.01     -0.03
      SEX     -0.18      0.03      0.15      0.04      0.20      0.23
 FATHEDUC      0.17      0.01      0.05      0.04      0.05      0.05
 MOTHEDUC      0.10     -0.03      0.04      0.00      0.14      0.04
   INCOME      0.17     -0.06      0.04     -0.01      0.02     -0.02

          CORRELATION MATRIX TO BE ANALYZED

            STUDGOVT  OTHRABIL  LEADABIL  SPEAKABL   COLTYPE    MSEGPA
            --------  --------  --------  --------  --------  --------
 STUDGOVT      1.00
 OTHRABIL      0.23      1.00
 LEADABIL      0.40      0.59      1.00
 SPEAKABL      0.24      0.48      0.61      1.00
  COLTYPE      0.18      0.05      0.11      0.19      1.00
   MSEGPA      0.02     -0.02      0.00      0.03     -0.04      1.00
     Q19H      0.08      0.07      0.07      0.03      0.21      0.03
     Q19L      0.09      0.12      0.10      0.04      0.12      0.02
     Q19Q      0.02      0.07      0.04      0.02      0.16     -0.02
     Q19R      0.00      0.06      0.05     -0.01     -0.03      0.32
     Q19S     -0.02      0.05      0.05     -0.04      0.04      0.26
     Q21A      0.01      0.10      0.06      0.04     -0.16      0.07
     Q21E     -0.07      0.07     -0.02     -0.05      0.04      0.03
     Q21F      0.19      0.17      0.29      0.17      0.13      0.00
     Q21J      0.15      0.14      0.13      0.13      0.19      0.00
     Q21M     -0.01      0.04      0.04      0.01      0.10      0.21
     Q21N     -0.04      0.04      0.03      0.00      0.05      0.21
     Q21P      0.13      0.14      0.15      0.10      0.01      0.04
     Q21Q     -0.03      0.02      0.06      0.04      0.03      0.23
     Q21R      0.15      0.11      0.13      0.13      0.11      0.07
     Q22C      0.01      0.01     -0.04     -0.09     -0.01      0.03
    MSE90     -0.02     -0.04     -0.03     -0.06      0.17      0.28
      SEX      0.17      0.13      0.06      0.13      0.08      0.00
 FATHEDUC      0.04      0.07      0.11      0.14      0.20      0.07
 MOTHEDUC      0.05      0.10      0.10      0.13      0.15      0.01
   INCOME      0.01      0.05      0.05      0.09      0.08      0.00

          CORRELATION MATRIX TO BE ANALYZED

                Q19H      Q19L      Q19Q      Q19R      Q19S      Q21A
            --------  --------  --------  --------  --------  --------
     Q19H      1.00
     Q19L      0.62      1.00
     Q19Q      0.54      0.62      1.00
     Q19R      0.33      0.34      0.29      1.00
     Q19S      0.43      0.42      0.30      0.87      1.00
     Q21A      0.05      0.02      0.04      0.12      0.07      1.00
     Q21E      0.15      0.14      0.16      0.09      0.16      0.44
     Q21F      0.19      0.15      0.16      0.04      0.08      0.17
     Q21J      0.20      0.19      0.18      0.07      0.05      0.02
     Q21M      0.29      0.21      0.14      0.60      0.62      0.18
     Q21N      0.24      0.19      0.13      0.57      0.56      0.19
     Q21P      0.15      0.19      0.11      0.13      0.07      0.09
     Q21Q      0.25      0.21      0.13      0.58      0.59      0.20
     Q21R      0.18      0.16      0.10      0.13      0.11      0.15
```

```
        Q22C      0.22      0.17      0.15      0.25      0.23      0.38
       MSE90      0.32      0.20      0.16      0.65      0.69      0.09
         SEX      0.05      0.13      0.02     -0.05     -0.17      0.02
    FATHEDUC     -0.04     -0.06     -0.08      0.00     -0.01     -0.01
    MOTHEDUC      0.05      0.01     -0.01      0.00      0.02     -0.02
      INCOME     -0.08     -0.08     -0.08     -0.05     -0.02      0.03

            CORRELATION MATRIX TO BE ANALYZED

                  Q21E      Q21F      Q21J      Q21M      Q21N      Q21P
              --------  --------  --------  --------  --------  --------
        Q21E      1.00
        Q21F      0.18      1.00
        Q21J     -0.02      0.43      1.00
        Q21M      0.18      0.22      0.20      1.00
        Q21N      0.15      0.22      0.20      0.85      1.00
        Q21P      0.02      0.40      0.42      0.22      0.24      1.00
        Q21Q      0.10      0.19      0.19      0.86      0.84      0.23
        Q21R      0.10      0.44      0.52      0.29      0.31      0.47
        Q22C      0.67      0.07     -0.08      0.20      0.14      0.02
       MSE90      0.11      0.04      0.02      0.50      0.42      0.00
         SEX      0.03     -0.03      0.19     -0.14     -0.16      0.12
    FATHEDUC     -0.06     -0.04     -0.06     -0.03     -0.03     -0.05
    MOTHEDUC     -0.04     -0.01      0.03     -0.04     -0.04      0.01
      INCOME     -0.01     -0.09     -0.11     -0.06     -0.06     -0.07

            CORRELATION MATRIX TO BE ANALYZED

                  Q21Q      Q21R      Q22C     MSE90       SEX  FATHEDUC
              --------  --------  --------  --------  --------  --------
        Q21Q      1.00
        Q21R      0.28      1.00
        Q22C      0.12      0.04      1.00
       MSE90      0.49     -0.01      0.19      1.00
         SEX     -0.17      0.07     -0.04     -0.16      1.00
    FATHEDUC     -0.02     -0.04     -0.11      0.01      0.07      1.00
    MOTHEDUC     -0.01      0.01     -0.08      0.06      0.14      0.65
      INCOME     -0.04     -0.06     -0.05     -0.01      0.04      0.54

            CORRELATION MATRIX TO BE ANALYZED

              MOTHEDUC    INCOME
              --------  --------
    MOTHEDUC      1.00
      INCOME      0.46      1.00


    BASIC14.SPL, DIRECT AND INDIRECT EFFECTS ON PERSISTENCE IN
   SCIENCE/ENGINEERING
    Number of Iterations = 46

    LISREL ESTIMATES (MAXIMUM LIKELIHOOD)

        SATM = 0.37*MSciAch, Errorvar.= 0.86  , R² = 0.14
              (0.023)                  (0.027)
               16.25                    31.80

     MATHGRD = 0.68*MSciAch, Errorvar.= 0.54  , R² = 0.46
              (0.021)                  (0.021)
               31.88                    25.56

      BIOGRD = 0.66*MSciAch, Errorvar.= 0.56  , R² = 0.44
              (0.021)                  (0.021)
```

```
           31.00                            26.25

 PHYSGRD = 0.80*MSciAch, Errorvar.= 0.36  , R² = 0.64
          (0.021)                  (0.020)
           38.67                    17.77

COMMSERV = 0.34*Social, Errorvar.= 0.88  , R² = 0.12
          (0.022)                 (0.027)
           15.25                   32.37

   CLUBS = 0.48*Social, Errorvar.= 0.77  , R² = 0.23
          (0.022)                 (0.025)
           22.18                   31.27

STUDGOVT = 0.43*Social, Errorvar.= 0.81  , R² = 0.19
          (0.022)                 (0.026)
           19.71                   31.71

OTHRABIL = 0.66*Social, Errorvar.= 0.57  , R² = 0.43
          (0.021)                 (0.020)
           31.79                   27.95

LEADABIL = 0.88*Social, Errorvar.= 0.22  , R² = 0.78
          (0.020)                 (0.018)
           45.17                   12.20

SPEAKABL = 0.69*Social, Errorvar.= 0.53  , R² = 0.47
          (0.020)                 (0.020)
           33.61                   26.78

 COLTYPE = 0.97*TypeCol, Errorvar.= 0.050, R² = 0.95
          (0.016)
           60.03

  MSEGPA = 0.95*ColSciGd, Errorvar.= 0.10, R² = 0.90
          (0.018)
           53.49

    Q19H = 0.76*ColMin, Errorvar.= 0.43  , R² = 0.57
          (0.020)                 (0.018)
           37.91                   24.26

    Q19L = 0.83*ColMin, Errorvar.= 0.31  , R² = 0.69
          (0.020)                 (0.017)
           42.52                   18.74

    Q19Q = 0.72*ColMin, Errorvar.= 0.48  , R² = 0.52
          (0.020)                 (0.018)
           35.63                   26.13

    Q19R = 0.92*Commit, Errorvar.= 0.18   , R² = 0.83
          (0.022)                 (0.0083)
           42.49                   21.17

    Q19S = 0.97*Commit, Errorvar.= 0.086  , R² = 0.92
          (0.022)                 (0.0076)
           43.03                   11.39

    Q21A = 0.50*Security, Errorvar.= 0.75  , R² = 0.25
          (0.022)                   (0.025)
           22.35                     30.68

    Q21E = 0.83*Security, Errorvar.= 0.31  , R² = 0.69
          (0.023)                   (0.026)
```

```
           36.23                     12.04

    Q21F = 0.63*Service, Errorvar.= 0.60  , R² = 0.40
          (0.022)                  (0.022)
           28.14                    27.01

    Q21J = 0.70*Service, Errorvar.= 0.51  , R² = 0.49
          (0.022)                  (0.021)
           31.49                    24.18

    Q21M = 0.94*SciAmbit, Errorvar.= 0.12   , R² = 0.88
          (0.017)                   (0.0064)
           55.28                     18.86

    Q21N = 0.91*SciAmbit, Errorvar.= 0.18   , R² = 0.82
          (0.017)                   (0.0074)
           52.59                     23.91

    Q21P = 0.63*Service, Errorvar.= 0.61  , R² = 0.39
          (0.022)                  (0.022)
           27.98                    27.12

    Q21Q = 0.92*SciAmbit, Errorvar.= 0.16   , R² = 0.84
          (0.017)                   (0.0070)
           53.52                     22.42

    Q21R = 0.72*Service, Errorvar.= 0.48  , R² = 0.52
          (0.022)                  (0.021)
           32.62                    22.88

    Q22C = 0.81*Security, Errorvar.= 0.35  , R² = 0.65
          (0.023)                   (0.025)
           35.54                     13.77

   MSE90 = 0.98*Outcome, Errorvar.= 0.050, R² = 0.95
          (0.019)
           52.40


     SEX = 0.97*Gender, Errorvar.= 0.050, R² = 0.95
          (0.015)
           63.00

FATHEDUC = 0.89*Ses, Errorvar.= 0.21  , R² = 0.79
          (0.021)              (0.023)
           42.93                9.04

MOTHEDUC = 0.74*Ses, Errorvar.= 0.46  , R² = 0.54
          (0.021)              (0.021)
           35.14                22.11

  INCOME = 0.61*Ses, Errorvar.= 0.63  , R² = 0.37
          (0.021)              (0.022)
           28.64                28.77

Error Covariance for STUDGOVT and CLUBS = 0.45
                                         (0.021)
                                          21.73

 MSciAch = 0.062*Gender + 0.056*Ses, Errorvar.= 0.99, R² = 0.0076
          (0.025)        (0.026)
           2.48           2.11

  Social = 0.13*Gender + 0.14*Ses, Errorvar.= 0.96, R² = 0.041
```

```
          (0.024)        (0.025)
           5.61           5.59

 TypeCol = 0.31*MSciAch + 0.082*Social + 0.034*Gender + 0.19*Ses,
          (0.025)        (0.023)        (0.022)        (0.023)
           12.61          3.56           1.56           7.97

            Errorvar.= 0.84, R² = 0.16

  ColMin =  - 0.093*MSciAch + 0.10*Social + 0.24*TypeCol + 0.087*Gender
             (0.028)         (0.026)       (0.027)        (0.024)
             -3.32            4.02          9.10           3.62

            - 0.14*Ses, Errorvar.= 0.92, R² = 0.082
             (0.026)
             -5.43

ColSciGd = 0.49*MSciAch - 0.061*Social - 0.24*TypeCol + 0.11*ColMin
          (0.029)        (0.023)        (0.026)        (0.024)
           16.70          -2.59          -9.53          4.31

            - 0.023*Gender + 0.10*Ses, Errorvar.= 0.78, R² = 0.22
             (0.022)        (0.024)
             -1.07           4.27

SciAmbit = 0.19*MSciAch + 0.022*Social - 0.048*TypeCol + 0.34*ColMin
          (0.025)        (0.023)        (0.024)         (0.025)
           7.49           0.97           -1.97           13.35

            - 0.22*Gender - 0.0079*Ses, Errorvar.= 0.83, R² = 0.17
             (0.022)       (0.024)
             -9.71         -0.34

  Commit = 0.14*MSciAch + 0.027*Social - 0.12*TypeCol + 0.44*ColMin
          (0.022)        (0.018)        (0.019)        (0.025)
           6.21           1.56           -6.42          17.51

            + 0.11*ColSciGd + 0.55*SciAmbit - 0.21*Service + 0.032*Security
             (0.019)         (0.023)         (0.021)        (0.017)
              5.90            24.09          -9.94           1.90

            - 0.077*Gender + 0.054*Ses, Errorvar.= 0.33, R² = 0.67
             (0.016)        (0.017)
             -4.76           3.09

 Service = 0.034*MSciAch + 0.26*Social + 0.086*TypeCol + 0.28*ColMin
          (0.027)         (0.027)       (0.027)         (0.027)
           1.23            9.95          3.22            10.08

            + 0.070*Gender - 0.12*Ses, Errorvar.= 0.79, R² = 0.21
             (0.024)        (0.026)
              2.94          -4.57

Security =  - 0.040*MSciAch - 0.037*Social - 0.024*TypeCol + 0.26*ColMin
             (0.028)         (0.026)        (0.027)         (0.028)
             -1.44           -1.43          -0.89            9.44

            - 0.016*Gender - 0.065*Ses, Errorvar.= 0.92, R² = 0.076
             (0.024)        (0.027)
             -0.68          -2.44

 Outcome =  - 0.053*MSciAch - 0.063*Social + 0.23*TypeCol - 0.12*ColMin
             (0.023)         (0.018)        (0.020)        (0.027)
             -2.32           -3.53          11.29          -4.30
```

```
        + 0.094*ColSciGd + 0.038*SciAmbit + 0.75*Commit - 0.073*Service
         (0.019)          (0.024)           (0.038)       (0.022)
          4.91             1.56              19.61         -3.34

        + 0.030*Security - 0.037*Gender - 0.020*Ses, Errorvar.= 0.39,
         (0.017)          (0.016)        (0.018)
          1.71            -2.24          -1.14

        R² = 0.61

    CORRELATION MATRIX OF INDEPENDENT VARIABLES

             Gender        Ses
            --------   --------
   Gender     1.00

      Ses     0.10       1.00
            (0.02)
              4.24

    COVARIANCE MATRIX OF LATENT VARIABLES

             MSciAch     Social    TypeCol     ColMin   ColSciGd   SciAmbit
            --------   --------   --------   --------   --------   --------
  MSciAch     1.00
   Social     0.02       1.00
  TypeCol     0.33       0.12       1.00
   ColMin    -0.01       0.12       0.20       1.00
 ColSciGd     0.41      -0.06      -0.05       0.03       1.00
 SciAmbit     0.16       0.03       0.07       0.31       0.09       1.00
   Commit     0.21       0.01       0.02       0.51       0.24       0.70
  Service     0.06       0.30       0.16       0.34       0.00       0.10
 Security    -0.06      -0.02       0.00       0.26      -0.01       0.08
  Outcome     0.21      -0.08       0.17       0.30       0.24       0.54
   Gender     0.07       0.15       0.09       0.10       0.00      -0.17
      Ses     0.06       0.15       0.22      -0.07       0.06      -0.05

    COVARIANCE MATRIX OF LATENT VARIABLES

              Commit    Service   Security    Outcome     Gender        Ses
            --------   --------   --------   --------   --------   --------
   Commit     1.00
  Service    -0.02       1.00
 Security     0.16       0.07       1.00
  Outcome     0.74      -0.11       0.12       1.00
   Gender    -0.14       0.13      -0.01      -0.17       1.00
      Ses    -0.01      -0.07      -0.10       0.02       0.10       1.00

                          GOODNESS OF FIT STATISTICS

           CHI-SQUARE WITH 408 DEGREES OF FREEDOM = 4437.64 (P = 0.0)
             ESTIMATED NON-CENTRALITY PARAMETER (NCP) = 4029.64

                       MINIMUM FIT FUNCTION VALUE = 2.02
             POPULATION DISCREPANCY FUNCTION VALUE (F0) = 1.83
           ROOT MEAN SQUARE ERROR OF APPROXIMATION (RMSEA) = 0.067
             P-VALUE FOR TEST OF CLOSE FIT (RMSEA < 0.05) = 1.00

                EXPECTED CROSS-VALIDATION INDEX (ECVI) = 2.13
                       ECVI FOR SATURATED MODEL = 0.48
```

```
                    ECVI FOR INDEPENDENCE MODEL = 14.95

     CHI-SQUARE FOR INDEPENDENCE MODEL WITH 496 DEGREES OF FREEDOM = 32813.55
                        INDEPENDENCE AIC = 32877.55
                            MODEL AIC = 4677.64
                          SATURATED AIC = 1056.00
                        INDEPENDENCE CAIC = 33091.83
                            MODEL CAIC = 5481.19
                          SATURATED CAIC = 4591.60

                  ROOT MEAN SQUARE RESIDUAL (RMR) = 0.065
                          STANDARDIZED RMR = 0.065
                     GOODNESS OF FIT INDEX (GFI) = 0.89
                ADJUSTED GOODNESS OF FIT INDEX (AGFI) = 0.86
               PARSIMONY GOODNESS OF FIT INDEX (PGFI) = 0.69

                       NORMED FIT INDEX (NFI) = 0.86
                     NON-NORMED FIT INDEX (NNFI) = 0.85
                  PARSIMONY NORMED FIT INDEX (PNFI) = 0.71
                     COMPARATIVE FIT INDEX (CFI) = 0.88
                     INCREMENTAL FIT INDEX (IFI) = 0.88
                      RELATIVE FIT INDEX (RFI) = 0.84

                          CRITICAL N (CN) = 237.56


 CONFIDENCE LIMITS COULD NOT BE COMPUTED DUE TO TOO SMALL P-VALUE FOR
CHI-SQUARE


 BASIC14.SPL, DIRECT AND INDIRECT EFFECTS ON PERSISTENCE IN
SCIENCE/ENGINEERING

 SUMMARY STATISTICS FOR FITTED RESIDUALS
 SMALLEST FITTED RESIDUAL =   -0.21
   MEDIAN FITTED RESIDUAL =    0.00
  LARGEST FITTED RESIDUAL =    0.29

 STEMLEAF PLOT
 - 2|1
 - 1|5
 - 1|221100
 - 0|99888887777777777666666666665555555555555555555555
 -
0|44444444444444444444444444333333333333333333333333222222222222222222222222+41

0|111111111111111111111111111111111111111111222222222222222222222222222222+53
   0|555555555555555555555555666666666666666666777777777778888888888889999
   1|000000011111111122222233333334444444444
   1|55555555566666777888
   2|01244
   2|9

 SUMMARY STATISTICS FOR STANDARDIZED RESIDUALS
 SMALLEST STANDARDIZED RESIDUAL =  -10.87
   MEDIAN STANDARDIZED RESIDUAL =    0.42
  LARGEST STANDARDIZED RESIDUAL =   13.86

 STEMLEAF PLOT
 -10|985
 - 9|9
 - 8|73200
 - 7|21
 - 6|2
 - 5|998864444321100
 - 4|99987655422221110000
 - 3|9998666554444433333221100000
 - 2|8887776666555555444444433333322200000
 - 1|9999888877776666655444444333332222211111100000
 -
0|999999999999888887777777766665555554443333322222221110000000000000000+09
   0|1111222222223333334444455555555666666777788888889999
   1|000000111112222222233334445555566666666777778999999
   2|0001111123333444444455555566677777788888899
   3|0000112222223333345666666778899
   4|001222233444466999
   5|0011222233334555555677779
   6|1223446788999999
   7|001122244455567899
   8|0001123345556779
   9|0122234
  10|045
  11|258
  12|8
  13|9
 LARGEST NEGATIVE STANDARDIZED RESIDUALS
 RESIDUAL FOR   BIOGRD AND     SATM  -3.63
 RESIDUAL FOR COMMSERV AND     SATM  -2.81
 RESIDUAL FOR OTHRABIL AND     SATM  -3.31
 RESIDUAL FOR OTHRABIL AND    CLUBS  -8.17
 RESIDUAL FOR OTHRABIL AND STUDGOVT  -4.14
 RESIDUAL FOR LEADABIL AND COMMSERV  -5.26
 RESIDUAL FOR SPEAKABL AND    CLUBS  -5.02
 RESIDUAL FOR SPEAKABL AND STUDGOVT  -5.38
 RESIDUAL FOR   MSEGPA AND   BIOGRD  -2.70
 RESIDUAL FOR   MSEGPA AND  PHYSGRD  -3.91
 RESIDUAL FOR   MSEGPA AND   MSEGPA  -8.28
 RESIDUAL FOR     Q19H AND     SATM  -3.31
 RESIDUAL FOR     Q19L AND     SATM  -4.16
 RESIDUAL FOR     Q19L AND  COLTYPE  -5.39
 RESIDUAL FOR     Q19L AND     Q19H  -2.98
 RESIDUAL FOR     Q19Q AND LEADABIL  -3.06
 RESIDUAL FOR     Q19Q AND   MSEGPA  -3.00
 RESIDUAL FOR     Q19R AND  COLTYPE  -6.21
 RESIDUAL FOR     Q19R AND     Q19L  -4.96
 RESIDUAL FOR     Q19R AND     Q19Q  -3.76
 RESIDUAL FOR     Q19R AND     Q19R  -3.98
 RESIDUAL FOR     Q19S AND SPEAKABL  -3.36
 RESIDUAL FOR     Q19S AND     Q19Q  -4.59
 RESIDUAL FOR     Q19S AND     Q19R  -5.85
 RESIDUAL FOR     Q19S AND     Q19S  -9.92
 RESIDUAL FOR     Q21A AND  COLTYPE  -8.70
 RESIDUAL FOR     Q21A AND     Q19L  -4.92
 RESIDUAL FOR     Q21A AND     Q19Q  -2.79
 RESIDUAL FOR     Q21E AND     SATM  -3.39
 RESIDUAL FOR     Q21E AND    CLUBS  -3.17
 RESIDUAL FOR     Q21E AND STUDGOVT  -3.37
 RESIDUAL FOR     Q21E AND     Q19L  -3.45
 RESIDUAL FOR     Q21F AND     SATM  -5.44
 RESIDUAL FOR     Q21J AND     SATM  -4.84
 RESIDUAL FOR     Q21J AND LEADABIL  -4.02
 RESIDUAL FOR     Q21J AND     Q21E  -3.31
 RESIDUAL FOR     Q21M AND     Q19L  -2.97
 RESIDUAL FOR     Q21M AND     Q19Q  -5.39
 RESIDUAL FOR     Q21N AND   BIOGRD  -3.13
 RESIDUAL FOR     Q21N AND STUDGOVT  -2.79
 RESIDUAL FOR     Q21N AND     Q19L  -4.18
 RESIDUAL FOR     Q21N AND     Q19Q  -5.06
RESIDUAL FOR     Q21N AND     Q19S  -7.14
RESIDUAL FOR     Q21P AND     SATM  -3.42
RESIDUAL FOR     Q21P AND  COLTYPE  -5.91
RESIDUAL FOR     Q21P AND     Q19Q  -2.60
RESIDUAL FOR     Q21Q AND  COLTYPE  -3.94
RESIDUAL FOR     Q21Q AND     Q19Q  -5.57
RESIDUAL FOR     Q21Q AND     Q19S  -3.62
RESIDUAL FOR     Q21R AND     SATM  -3.50
RESIDUAL FOR     Q21R AND LEADABIL  -4.89
RESIDUAL FOR     Q21R AND     Q19L  -3.27
RESIDUAL FOR     Q21R AND     Q19Q  -5.12
RESIDUAL FOR     Q22C AND     SATM  -5.79
RESIDUAL FOR     Q22C AND   BIOGRD  -2.97
RESIDUAL FOR     Q22C AND    CLUBS  -3.87
RESIDUAL FOR     Q22C AND LEADABIL  -2.60
RESIDUAL FOR     Q22C AND SPEAKABL  -5.22
RESIDUAL FOR     Q22C AND     Q21A  -4.94
RESIDUAL FOR     Q22C AND     Q21E  -4.12
RESIDUAL FOR     Q22C AND     Q21J  -5.95
RESIDUAL FOR    MSE90 AND   BIOGRD  -3.28
RESIDUAL FOR    MSE90 AND     Q19L  -5.37
RESIDUAL FOR    MSE90 AND     Q19Q  -4.39
RESIDUAL FOR    MSE90 AND     Q19R  -3.40
RESIDUAL FOR    MSE90 AND     Q19S  -4.20
RESIDUAL FOR    MSE90 AND     Q21N  -8.01
RESIDUAL FOR    MSE90 AND    MSE90  -4.47
RESIDUAL FOR      SEX AND     SATM -10.78
RESIDUAL FOR      SEX AND LEADABIL -10.48
RESIDUAL FOR      SEX AND     Q19Q  -4.22
RESIDUAL FOR      SEX AND     Q19S -10.87
RESIDUAL FOR      SEX AND     Q21F  -8.03
RESIDUAL FOR      SEX AND     Q21Q  -2.70
RESIDUAL FOR      SEX AND     Q22C  -4.02
RESIDUAL FOR      SEX AND    MSE90  -7.21
RESIDUAL FOR FATHEDUC AND     Q22C  -4.14
RESIDUAL FOR FATHEDUC AND      SEX  -3.98
RESIDUAL FOR MOTHEDUC AND  MATHGRD  -3.60
RESIDUAL FOR MOTHEDUC AND  PHYSGRD  -2.67
RESIDUAL FOR MOTHEDUC AND   MSEGPA  -2.62
RESIDUAL FOR   INCOME AND  MATHGRD  -4.53
RESIDUAL FOR   INCOME AND    CLUBS  -3.16
RESIDUAL FOR   INCOME AND  COLTYPE  -3.05
RESIDUAL FOR   INCOME AND     Q19Q  -2.65
RESIDUAL FOR   INCOME AND     Q21F  -3.31
RESIDUAL FOR   INCOME AND     Q21J  -4.68
LARGEST POSITIVE STANDARDIZED RESIDUALS
RESIDUAL FOR  PHYSGRD AND   BIOGRD   4.86
RESIDUAL FOR COMMSERV AND  MATHGRD   2.72
RESIDUAL FOR COMMSERV AND   BIOGRD   5.21
RESIDUAL FOR    CLUBS AND     SATM   3.60
RESIDUAL FOR    CLUBS AND  MATHGRD   9.33
RESIDUAL FOR    CLUBS AND   BIOGRD  13.86
RESIDUAL FOR    CLUBS AND  PHYSGRD  11.52
RESIDUAL FOR    CLUBS AND COMMSERV   9.16
RESIDUAL FOR STUDGOVT AND  MATHGRD   7.04
RESIDUAL FOR STUDGOVT AND   BIOGRD   8.16
RESIDUAL FOR STUDGOVT AND  PHYSGRD   6.93
RESIDUAL FOR STUDGOVT AND COMMSERV   4.45
RESIDUAL FOR LEADABIL AND  MATHGRD   5.47
RESIDUAL FOR LEADABIL AND   BIOGRD   6.99
RESIDUAL FOR LEADABIL AND  PHYSGRD   6.87
RESIDUAL FOR LEADABIL AND    CLUBS   5.27
RESIDUAL FOR LEADABIL AND STUDGOVT   4.29
RESIDUAL FOR SPEAKABL AND     SATM   2.84
RESIDUAL FOR SPEAKABL AND  MATHGRD   2.72
RESIDUAL FOR SPEAKABL AND   BIOGRD   7.98
RESIDUAL FOR SPEAKABL AND  PHYSGRD   6.23
RESIDUAL FOR SPEAKABL AND OTHRABIL   3.66
RESIDUAL FOR  COLTYPE AND     SATM   3.06
RESIDUAL FOR  COLTYPE AND    CLUBS   9.97
RESIDUAL FOR  COLTYPE AND STUDGOVT   7.09
RESIDUAL FOR  COLTYPE AND SPEAKABL   7.47
RESIDUAL FOR  COLTYPE AND  COLTYPE   8.29
RESIDUAL FOR   MSEGPA AND    CLUBS   3.18
RESIDUAL FOR   MSEGPA AND LEADABIL   5.52
RESIDUAL FOR   MSEGPA AND SPEAKABL   4.24
RESIDUAL FOR   MSEGPA AND  COLTYPE   9.04
RESIDUAL FOR     Q19H AND  MATHGRD   3.58
RESIDUAL FOR     Q19H AND   BIOGRD   2.71
RESIDUAL FOR     Q19H AND COMMSERV   5.27
RESIDUAL FOR     Q19H AND    CLUBS   2.79
RESIDUAL FOR     Q19H AND  COLTYPE   5.59
RESIDUAL FOR     Q19L AND COMMSERV   2.93
RESIDUAL FOR     Q19L AND    CLUBS   2.75
RESIDUAL FOR     Q19L AND STUDGOVT   2.61
RESIDUAL FOR     Q19L AND OTHRABIL   3.53
RESIDUAL FOR     Q19Q AND     Q19L   6.88
RESIDUAL FOR     Q19R AND OTHRABIL   3.34
RESIDUAL FOR     Q19R AND LEADABIL   4.37
RESIDUAL FOR     Q19R AND   MSEGPA  10.40
RESIDUAL FOR     Q19S AND COMMSERV   3.34
RESIDUAL FOR     Q19S AND OTHRABIL   2.95
RESIDUAL FOR     Q19S AND LEADABIL   4.59
RESIDUAL FOR     Q19S AND  COLTYPE   7.89
RESIDUAL FOR     Q19S AND   MSEGPA   4.90
RESIDUAL FOR     Q19S AND     Q19H   6.06
RESIDUAL FOR     Q21A AND COMMSERV   5.74
RESIDUAL FOR     Q21A AND OTHRABIL   5.50
RESIDUAL FOR     Q21A AND LEADABIL   3.68
RESIDUAL FOR     Q21A AND   MSEGPA   3.64
RESIDUAL FOR     Q21A AND     Q19R   2.61
RESIDUAL FOR     Q21E AND  MATHGRD   5.22
RESIDUAL FOR     Q21E AND OTHRABIL   4.97
RESIDUAL FOR     Q21E AND  COLTYPE   5.45
RESIDUAL FOR     Q21E AND     Q21A   7.44
RESIDUAL FOR     Q21F AND  PHYSGRD   2.96
RESIDUAL FOR     Q21F AND COMMSERV   7.52
RESIDUAL FOR     Q21F AND    CLUBS   4.04
RESIDUAL FOR     Q21F AND STUDGOVT   5.51
RESIDUAL FOR     Q21F AND OTHRABIL   2.80
RESIDUAL FOR     Q21F AND LEADABIL   8.48
RESIDUAL FOR     Q21F AND     Q19R   3.18
RESIDUAL FOR     Q21F AND     Q19S   5.49
RESIDUAL FOR     Q21F AND     Q21A   6.93
RESIDUAL FOR     Q21F AND     Q21E   7.10
RESIDUAL FOR     Q21J AND   BIOGRD   3.27
RESIDUAL FOR     Q21J AND COMMSERV   5.53
RESIDUAL FOR     Q21J AND    CLUBS   2.73
RESIDUAL FOR     Q21J AND STUDGOVT   2.83
RESIDUAL FOR     Q21J AND  COLTYPE   6.23
RESIDUAL FOR     Q21J AND     Q19R   4.94
RESIDUAL FOR     Q21J AND     Q19S   4.20
RESIDUAL FOR     Q21M AND  COLTYPE   6.74
RESIDUAL FOR     Q21M AND   MSEGPA   8.03
RESIDUAL FOR     Q21M AND     Q19H   6.42
RESIDUAL FOR     Q21M AND     Q21A   6.86
RESIDUAL FOR     Q21M AND     Q21E   6.37
RESIDUAL FOR     Q21M AND     Q21F   8.28
RESIDUAL FOR     Q21M AND     Q21J    7.16
RESIDUAL FOR     Q21N AND   MSEGPA    7.46
RESIDUAL FOR     Q21N AND     Q21A    7.62
RESIDUAL FOR     Q21N AND     Q21E    5.05
RESIDUAL FOR     Q21N AND     Q21F    8.51
RESIDUAL FOR     Q21N AND     Q21J    7.16
RESIDUAL FOR     Q21N AND     Q21M    2.70
RESIDUAL FOR     Q21P AND COMMSERV    3.92
RESIDUAL FOR     Q21P AND     Q19R    8.10
RESIDUAL FOR     Q21P AND     Q19S    5.26
RESIDUAL FOR     Q21P AND     Q21A    3.24
RESIDUAL FOR     Q21P AND     Q21M    8.49
RESIDUAL FOR     Q21P AND     Q21N    9.23
RESIDUAL FOR     Q21Q AND LEADABIL    3.98
RESIDUAL FOR     Q21Q AND   MSEGPA    8.71
RESIDUAL FOR     Q21Q AND     Q19H    3.26
RESIDUAL FOR     Q21Q AND     Q21A    8.00
RESIDUAL FOR     Q21Q AND     Q21F    6.91
RESIDUAL FOR     Q21Q AND     Q21J    6.61
RESIDUAL FOR     Q21Q AND     Q21N    5.18
RESIDUAL FOR     Q21Q AND     Q21P    9.14
RESIDUAL FOR     Q21R AND   BIOGRD    4.31
RESIDUAL FOR     Q21R AND  PHYSGRD    4.41
RESIDUAL FOR     Q21R AND COMMSERV    4.23
RESIDUAL FOR     Q21R AND STUDGOVT    3.17
RESIDUAL FOR     Q21R AND   MSEGPA    3.84
RESIDUAL FOR     Q21R AND     Q19R    9.36
RESIDUAL FOR     Q21R AND     Q19S    8.73
RESIDUAL FOR     Q21R AND     Q21A    5.73
RESIDUAL FOR     Q21R AND     Q21E    2.94
RESIDUAL FOR     Q21R AND     Q21J    3.27
RESIDUAL FOR     Q21R AND     Q21M   11.83
RESIDUAL FOR     Q21R AND     Q21N   12.80
RESIDUAL FOR     Q21R AND     Q21Q   11.21
RESIDUAL FOR     Q22C AND     Q19H    4.65
RESIDUAL FOR     Q22C AND     Q19R    9.16
RESIDUAL FOR     Q22C AND     Q19S    8.37
RESIDUAL FOR     Q22C AND     Q21M    7.17
RESIDUAL FOR     Q22C AND     Q21N    4.41
RESIDUAL FOR     Q22C AND     Q21Q    3.39
RESIDUAL FOR    MSE90 AND     SATM    3.63
RESIDUAL FOR    MSE90 AND LEADABIL    5.12
RESIDUAL FOR    MSE90 AND   MSEGPA    6.81
RESIDUAL FOR    MSE90 AND     Q19H    8.58
RESIDUAL FOR    MSE90 AND     Q21F    6.88
RESIDUAL FOR    MSE90 AND     Q21J    6.82
RESIDUAL FOR    MSE90 AND     Q21P    4.08
RESIDUAL FOR    MSE90 AND     Q21R    5.17
RESIDUAL FOR    MSE90 AND     Q22C    8.09
RESIDUAL FOR      SEX AND   BIOGRD    7.43
RESIDUAL FOR      SEX AND COMMSERV    7.82
RESIDUAL FOR      SEX AND    CLUBS    8.85
RESIDUAL FOR      SEX AND STUDGOVT    5.71
RESIDUAL FOR      SEX AND   MSEGPA    6.26
RESIDUAL FOR      SEX AND     Q19L    5.67
RESIDUAL FOR      SEX AND     Q19R   10.54
RESIDUAL FOR      SEX AND     Q21E    3.77
RESIDUAL FOR      SEX AND     Q21J    7.66
RESIDUAL FOR      SEX AND     Q21M    3.22
RESIDUAL FOR      SEX AND     Q21P    2.75
RESIDUAL FOR FATHEDUC AND     SATM    7.89
RESIDUAL FOR FATHEDUC AND SPEAKABL    2.96
RESIDUAL FOR FATHEDUC AND   MSEGPA    3.64
RESIDUAL FOR MOTHEDUC AND     SATM    4.24
RESIDUAL FOR MOTHEDUC AND COMMSERV    5.07
RESIDUAL FOR MOTHEDUC AND SPEAKABL    3.06
RESIDUAL FOR MOTHEDUC AND     Q19H    5.88
RESIDUAL FOR MOTHEDUC AND     Q19L    3.64
RESIDUAL FOR MOTHEDUC AND     Q21J    3.94
RESIDUAL FOR MOTHEDUC AND     Q21R    2.83
RESIDUAL FOR MOTHEDUC AND    MSE90    3.03
RESIDUAL FOR MOTHEDUC AND      SEX    5.30
RESIDUAL FOR   INCOME AND     SATM    7.40
RESIDUAL FOR   INCOME AND     Q21A    3.20
RESIDUAL FOR   INCOME AND     Q21E    2.61
RESIDUAL FOR   INCOME AND MOTHEDUC    3.05

      THE MODIFICATION INDICES SUGGEST TO ADD THE
 PATH TO  FROM       DECREASE IN CHI-SQUARE    NEW ESTIMATE
SATM      TypeCol               7.9                 0.06
SATM      ColMin               24.5                -0.11
SATM      Service              52.6                -0.17
SATM      Security             27.2                -0.12
SATM      Outcome              14.5                 0.08
MATHGRD   Security             14.7                 0.08
BIOGRD    Social               29.1                 0.10
BIOGRD    Security              9.8                -0.06
BIOGRD    Outcome               8.8                -0.06
PHYSGRD   Social               11.1                 0.06
PHYSGRD   ColSciGd              8.7                -0.07
COMMSERV  ColMin               17.1                 0.09
COMMSERV  Service              47.1                 0.17
CLUBS     MSciAch             101.1                 0.17
CLUBS     TypeCol              44.1                 0.11
CLUBS     Security             10.1                -0.05
STUDGOVT  Service               8.5                 0.06
OTHRABIL  MSciAch              30.8                -0.11
OTHRABIL  TypeCol              15.3                -0.07
OTHRABIL  ColMin                8.2                 0.05
OTHRABIL  Security             26.5                 0.10
LEADABIL  TypeCol              17.9                -0.07
LEADABIL  Service              15.2                -0.08
SPEAKABL  MSciAch               9.8                 0.06
SPEAKABL  TypeCol              32.7                 0.10
SPEAKABL  ColMin                9.7                -0.06
SPEAKABL  Commit               17.7                -0.07
SPEAKABL  Security             13.8                -0.07
COLTYPE   ColSciGd             13.5                 0.97
COLTYPE   SciAmbit             21.7                 0.42
COLTYPE   Commit               11.3                 0.50
COLTYPE   Service              18.4                 0.47
COLTYPE   Security             13.1                 0.33
COLTYPE   Outcome               9.4                 0.51
MSEGPA    SciAmbit             75.5                 0.20
MSEGPA    Commit               61.6                 0.31
MSEGPA    Outcome              56.3                 0.35
Q19H      MSciAch               8.7                 0.05
Q19H      TypeCol              28.8                 0.09
Q19H      SciAmbit             24.5                 0.09
Q19H      Commit               17.2                 0.09
Q19H      Outcome              68.1                 0.15
Q19L      TypeCol              35.0                -0.10
Q19L      SciAmbit             20.2                -0.08
Q19L      Security             15.3                -0.07
Q19L      Outcome              33.5                -0.11
Q19Q      Social                8.4                -0.05
Q19Q      ColSciGd             11.8                -0.06
Q19Q      SciAmbit             40.3                -0.12
```

Q19Q	Commit	27.7	-0.11
Q19Q	Service	8.8	-0.06
Q19Q	Outcome	21.9	-0.09
Q19R	TypeCol	46.0	-0.07
Q19R	ColMin	27.6	-0.08
Q19R	ColSciGd	47.0	0.08
Q19S	TypeCol	46.0	0.08
Q19S	ColMin	27.6	0.08
Q19S	ColSciGd	47.0	-0.09
Q21A	Social	24.6	0.10
Q21A	TypeCol	72.6	-0.17
Q21A	ColMin	17.2	-0.09
Q21A	ColSciGd	9.0	0.06
Q21A	SciAmbit	31.9	0.11
Q21A	Service	26.8	0.11
Q21E	TypeCol	29.4	0.09
Q21E	Commit	19.0	-0.08
Q21E	Service	9.0	0.05
Q21E	Outcome	15.0	-0.07
Q21F	Social	60.6	0.17
Q21F	Security	47.3	0.14
Q21F	Outcome	10.6	0.06
Q21J	TypeCol	29.3	0.10
Q21J	Security	51.1	-0.14
Q21M	TypeCol	34.0	0.06
Q21M	ColMin	7.9	0.03
Q21M	Commit	9.2	0.05
Q21M	Security	48.5	0.07
Q21M	Outcome	19.3	0.05
Q21N	Commit	21.5	-0.08
Q21N	Service	15.5	0.05
Q21N	Outcome	56.2	-0.10
Q21P	TypeCol	42.6	-0.13
Q21P	SciAmbit	14.1	0.07
Q21Q	TypeCol	21.0	-0.05
Q21Q	ColSciGd	8.9	0.03
Q21Q	Security	23.9	-0.05
Q21R	MSciAch	12.8	0.07
Q21R	Social	14.5	-0.08
Q21R	ColSciGd	11.8	0.06
Q21R	SciAmbit	53.7	0.13
Q21R	Commit	19.5	0.08
Q22C	Social	10.7	-0.06
Q22C	ColMin	16.6	0.08
Q22C	Commit	57.7	0.13
Q22C	Service	26.7	-0.09
Q22C	Outcome	40.9	0.11
FATHEDUC	Gender	15.8	-0.07
MOTHEDUC	Gender	28.1	0.09
MSciAch	Social	68.6	0.22
MSciAch	TypeCol	68.6	2.72
MSciAch	ColMin	68.6	1.80
MSciAch	ColSciGd	68.6	-3.28
MSciAch	SciAmbit	68.6	3.70
MSciAch	Commit	68.6	6.71
MSciAch	Service	68.6	0.73
MSciAch	Security	68.6	-32.29
MSciAch	Outcome	68.6	-3.68
Social	MSciAch	68.6	0.21
Social	TypeCol	68.6	0.69
Social	ColMin	68.6	-12.98
Social	ColSciGd	68.6	0.52
Social	SciAmbit	68.6	1.26
Social	Commit	68.6	0.99

```
Social    Service        68.6                3.82
Social    Security       68.6               -4.11
Social    Outcome        68.6                0.96
ColSciGd  SciAmbit       75.5                0.21
ColSciGd  Commit         61.6                0.33
ColSciGd  Outcome        56.3                0.37
SciAmbit  ColSciGd       75.5                0.23
SciAmbit  Commit         39.2               -0.71
SciAmbit  Service       179.2                0.37
SciAmbit  Security       44.5                0.16
SciAmbit  Outcome        11.3               -0.31
Service   SciAmbit      179.2                0.35
Service   Commit        184.4                0.64
Service   Outcome       177.4                0.74
Security  SciAmbit       44.5                0.18
Security  Commit         42.0                0.30
Security  Outcome        40.8                0.33

THE MODIFICATION INDICES SUGGEST TO ADD AN ERROR COVARIANCE
 BETWEEN    AND      DECREASE IN CHI-SQUARE    NEW ESTIMATE
Social    MSciAch        68.6                0.21
SciAmbit  ColSciGd       75.5                0.18
Service   SciAmbit      179.2                0.29
Security  SciAmbit       44.5                0.15
BIOGRD    SATM           13.2               -0.06
PHYSGRD   BIOGRD         23.6                0.11
COMMSERV  SATM           14.0               -0.07
COMMSERV  BIOGRD          9.7                0.05
CLUBS     BIOGRD         42.0                0.08
CLUBS     COMMSERV       61.9                0.12
OTHRABIL  SATM           10.3               -0.05
OTHRABIL  CLUBS          45.0               -0.09
LEADABIL  MATHGRD        12.6                0.04
LEADABIL  COMMSERV       27.6               -0.09
LEADABIL  CLUBS           9.0                0.04
SPEAKABL  SATM           10.9                0.05
SPEAKABL  MATHGRD        16.9               -0.06
SPEAKABL  BIOGRD          8.6                0.04
SPEAKABL  STUDGOVT        8.9               -0.04
SPEAKABL  OTHRABIL       13.4                0.06
COLTYPE   MATHGRD        10.7                0.05
COLTYPE   PHYSGRD        17.3               -0.07
COLTYPE   CLUBS           9.3                0.04
COLTYPE   LEADABIL       19.0               -0.06
COLTYPE   SPEAKABL       22.9                0.07
MSEGPA    PHYSGRD        11.8               -0.06
MSEGPA    COLTYPE        13.5                0.72
Q19H      COMMSERV       18.9                0.06
Q19H      COLTYPE         8.6                0.04
Q19L      PHYSGRD        10.1                0.04
Q19L      COLTYPE        24.5               -0.07
Q19L      Q19H            8.2               -0.06
Q19Q      COMMSERV       16.8               -0.06
Q19Q      Q19L           48.6                0.13
Q19R      SATM            9.2               -0.03
Q19R      CLUBS          31.8               -0.04
Q19R      STUDGOVT       18.1                0.03
Q19R      COLTYPE        32.2               -0.05
Q19R      MSEGPA         37.0                0.06
Q19R      Q19H           59.4               -0.06
Q19R      Q19L            8.8               -0.02
Q19R      Q19Q           21.4                0.04
Q19S      COMMSERV       14.3                0.03
Q19S      CLUBS           8.9                0.02
```

Q19S	STUDGOVT	8.3	-0.02
Q19S	SPEAKABL	16.7	-0.03
Q19S	COLTYPE	32.2	0.06
Q19S	MSEGPA	37.0	-0.06
Q19S	Q19H	21.0	0.03
Q19S	Q19L	22.9	0.03
Q19S	Q19Q	18.1	-0.03
Q21A	MATHGRD	13.5	-0.06
Q21A	PHYSGRD	14.0	0.05
Q21A	COMMSERV	23.0	0.09
Q21A	COLTYPE	110.1	-0.17
Q21A	Q19R	21.8	0.04
Q21A	Q19S	77.7	-0.07
Q21E	MATHGRD	27.6	0.07
Q21E	PHYSGRD	15.0	-0.05
Q21E	COMMSERV	9.0	-0.04
Q21E	STUDGOVT	34.8	-0.07
Q21E	OTHRABIL	12.4	0.04
Q21E	COLTYPE	26.5	0.07
Q21E	Q19H	8.4	-0.03
Q21E	Q19R	115.3	-0.08
Q21E	Q19S	57.2	0.05
Q21E	Q21A	55.2	0.25
Q21F	SATM	9.2	-0.05
Q21F	PHYSGRD	8.9	0.04
Q21F	COMMSERV	9.7	0.05
Q21F	LEADABIL	81.5	0.11
Q21F	Q19L	11.2	-0.04
Q21F	Q19R	38.3	-0.05
Q21F	Q21A	11.5	0.05
Q21F	Q21E	46.4	0.09
Q21J	BIOGRD	12.1	0.05
Q21J	PHYSGRD	33.4	-0.07
Q21J	COMMSERV	8.8	0.05
Q21J	LEADABIL	24.0	-0.06
Q21J	COLTYPE	29.7	0.08
Q21M	COMMSERV	10.7	0.03
Q21M	LEADABIL	9.6	-0.02
Q21M	COLTYPE	28.2	0.04
Q21M	Q19H	20.0	0.03
Q21M	Q19L	11.8	-0.02
Q21M	Q19Q	9.9	-0.02
Q21M	Q19S	9.5	0.01
Q21M	Q21A	13.0	-0.03
Q21M	Q21E	16.0	0.03
Q21N	BIOGRD	15.5	-0.03
Q21N	Q19R	21.0	0.02
Q21N	Q19S	9.0	-0.01
Q21N	Q21E	16.3	0.03
Q21P	COLTYPE	35.8	-0.10
Q21P	Q19L	12.4	0.04
Q21P	Q19R	33.9	0.05
Q21P	Q19S	23.1	-0.04
Q21P	Q21E	17.8	-0.05
Q21Q	OTHRABIL	14.1	-0.03
Q21Q	LEADABIL	9.2	0.02
Q21Q	SPEAKABL	11.6	0.03
Q21Q	COLTYPE	32.3	-0.05
Q21Q	Q19L	9.9	0.02
Q21Q	Q21A	48.3	0.06
Q21Q	Q21E	30.4	-0.04
Q21Q	Q21M	15.8	-0.04
Q21Q	Q21N	12.0	0.03
Q21Q	Q21P	9.8	0.03

Q21R	LEADABIL	16.3	-0.05
Q21R	Q19Q	22.7	-0.06
Q21R	Q21A	14.0	0.06
Q21R	Q21J	8.1	0.06
Q21R	Q21N	12.1	0.03
Q22C	SATM	14.7	-0.06
Q22C	CLUBS	26.3	-0.06
Q22C	STUDGOVT	49.6	0.08
Q22C	SPEAKABL	8.9	-0.04
Q22C	Q19H	19.7	0.05
Q22C	Q19R	70.7	0.06
Q22C	Q19S	9.1	-0.02
Q22C	Q21A	24.5	-0.16
Q22C	Q21E	18.1	-0.41
Q22C	Q21J	10.5	-0.04
Q22C	Q21M	9.7	0.02
Q22C	Q21N	17.7	-0.03
MSE90	Q19H	45.5	0.08
MSE90	Q19L	15.4	-0.04
MSE90	Q21A	13.8	0.05
MSE90	Q21F	11.9	0.04
MSE90	Q21J	12.7	0.04
MSE90	Q21N	39.5	-0.04
MSE90	Q21Q	15.9	0.03
MSE90	Q21R	36.2	-0.07
SEX	SATM	107.4	-0.20
SEX	BIOGRD	41.9	0.11
SEX	COMMSERV	55.9	0.14
SEX	CLUBS	30.7	0.08
SEX	OTHRABIL	8.3	0.05
SEX	LEADABIL	98.8	-0.16
SEX	COLTYPE	12.4	1.10
SEX	MSEGPA	64.0	0.66
SEX	Q19L	23.4	0.08
SEX	Q19Q	30.8	-0.09
SEX	Q19R	143.5	0.12
SEX	Q19S	143.5	-0.13
SEX	Q21F	71.4	-0.15
SEX	Q21J	67.5	0.14
SEX	Q21M	11.3	0.03
SEX	Q21P	14.7	0.07
SEX	SEX	17.8	-4.80
FATHEDUC	SATM	11.6	0.05
FATHEDUC	COMMSERV	9.5	-0.04
FATHEDUC	COLTYPE	18.5	0.07
FATHEDUC	MSEGPA	19.7	0.07
FATHEDUC	Q19R	13.6	0.03
FATHEDUC	MSE90	17.6	-0.05
FATHEDUC	SEX	14.7	-0.06
MOTHEDUC	COMMSERV	41.4	0.10
MOTHEDUC	LEADABIL	9.0	-0.03
MOTHEDUC	COLTYPE	10.4	-0.05
MOTHEDUC	MSEGPA	10.7	-0.05
MOTHEDUC	Q19H	15.6	0.05
MOTHEDUC	Q21J	12.7	0.05
MOTHEDUC	MSE90	24.2	0.05
MOTHEDUC	SEX	24.8	0.08
INCOME	SATM	25.3	0.08
INCOME	MATHGRD	13.3	-0.05
INCOME	CLUBS	8.6	-0.04
INCOME	Q19R	10.8	-0.03
INCOME	Q21J	12.2	-0.05
INCOME	MOTHEDUC	9.3	0.09

APPENDIX D

LISREL Solution for Male Sample

Appendix D

LISREL Solution for Male Sample (N = 1,510)

```
Number of Iterations =105

LISREL ESTIMATES (MAXIMUM LIKELIHOOD)

     SATM = 0.44*MSciAch, Errorvar.= 0.81  , R² = 0.19
           (0.028)                 (0.032)
            15.90                   25.37

  MATHGRD = 0.68*MSciAch, Errorvar.= 0.53  , R² = 0.47
           (0.026)                 (0.025)
            26.46                   20.97

   BIOGRD = 0.68*MSciAch, Errorvar.= 0.54  , R² = 0.46
           (0.026)                 (0.026)
            26.21                   21.16

  PHYSGRD = 0.80*MSciAch, Errorvar.= 0.35  , R² = 0.65
           (0.025)                 (0.024)
            32.25                   14.70

 COMMSERV = 0.33*Social, Errorvar.= 0.89  , R² = 0.11
           (0.028)                (0.034)
            11.93                  26.36

    CLUBS = 0.47*Social, Errorvar.= 0.78  , R² = 0.22
           (0.027)                (0.030)
            17.65                  25.52

 STUDGOVT = 0.46*Social, Errorvar.= 0.78  , R² = 0.22
           (0.027)                (0.031)
            17.26                  25.59

 OTHRABIL = 0.67*Social, Errorvar.= 0.55  , R² = 0.45
           (0.025)                (0.024)
            26.63                  22.52

 LEADABIL = 0.88*Social, Errorvar.= 0.22  , R² = 0.78
           (0.024)                (0.022)
            37.43                  9.94

 SPEAKABL = 0.69*Social, Errorvar.= 0.52  , R² = 0.48
           (0.025)                (0.024)
            27.68                  21.85

  COLTYPE = 0.97*TypeCol, Errorvar.= 0.050, R² = 0.95
           (0.020)
            48.86

   MSEGPA = 0.95*ColSciGd, Errorvar.= 0.10, R² = 0.90
           (0.022)
            43.39

     Q19H = 0.74*ColMin, Errorvar.= 0.46  , R² = 0.54
           (0.025)                (0.022)
            29.69                  20.70

     Q19L = 0.84*ColMin, Errorvar.= 0.29  , R² = 0.71
           (0.024)                (0.020)
            34.98                  14.43
    Q19Q = 0.74*ColMin, Errorvar.= 0.46  , R² = 0.55
          (0.025)                 (0.022)
           29.83                   20.59

    Q19R = 0.95*Commit, Errorvar.= 0.100  , R² = 0.90
          (0.027)                 (0.0095)
           35.83                   10.55

    Q19S = 0.92*Commit, Errorvar.= 0.16  , R² = 0.84
          (0.026)                 (0.010)
           35.46                   15.81

    Q21A = 0.49*Security, Errorvar.= 0.76  , R² = 0.24
          (0.028)                   (0.031)
           17.82                     24.72

    Q21E = 0.81*Security, Errorvar.= 0.35  , R² = 0.65
          (0.029)                   (0.033)
           27.96                     10.57

    Q21F = 0.65*Service, Errorvar.= 0.57  , R² = 0.42
          (0.027)                  (0.027)
           23.95                    21.62

    Q21J = 0.67*Service, Errorvar.= 0.55  , R² = 0.45
          (0.027)                  (0.026)
           24.71                    21.05

    Q21M = 0.95*SciAmbit, Errorvar.= 0.11   , R² = 0.89
          (0.021)                   (0.0078)
           45.95                     13.44

    Q21N = 0.90*SciAmbit, Errorvar.= 0.19   , R² = 0.81
          (0.021)                   (0.0095)
           42.39                     20.12

    Q21P = 0.66*Service, Errorvar.= 0.56  , R² = 0.44
          (0.027)                  (0.026)
           24.47                    21.24

    Q21Q = 0.91*SciAmbit, Errorvar.= 0.17   , R² = 0.83
          (0.021)                   (0.0090)
           43.41                     18.66

    Q21R = 0.74*Service, Errorvar.= 0.45  , R² = 0.55
          (0.027)                  (0.025)
           27.53                    18.17

    Q22C = 0.80*Security, Errorvar.= 0.36  , R² = 0.64
          (0.029)                   (0.033)
           27.81                     10.94

   MSE90 = 0.99*Outcome, Errorvar.= 0.050, R² = 0.95
          (0.024)
           41.32


FATHEDUC = 0.88*Ses, Errorvar.= 0.22  , R² = 0.78
          (0.025)              (0.026)
           35.59                8.30

MOTHEDUC = 0.76*Ses, Errorvar.= 0.43  , R² = 0.57
          (0.025)              (0.024)
```

```
           29.84                17.64

  INCOME = 0.63*Ses, Errorvar.= 0.60  , R² = 0.40
          (0.026)              (0.026)
           24.52                23.10

Error Covariance for STUDGOVT and CLUBS = 0.42
                                         (0.025)
                                          17.05

 MSciAch = 0.062*Ses, Errorvar.= 1.00, R² = 0.0038
          (0.032)
           1.93

  Social = 0.14*Ses, Errorvar.= 0.98, R² = 0.019
          (0.031)
           4.43

 TypeCol = 0.30*MSciAch + 0.096*Social + 0.20*Ses, Errorvar.= 0.85, R² = 0.15
          (0.030)        (0.028)        (0.029)
           9.98           3.46           7.13

  ColMin =  - 0.14*MSciAch + 0.11*Social + 0.30*TypeCol - 0.16*Ses,
             (0.034)        (0.031)       (0.033)        (0.032)
             -4.05           3.60          8.92          -4.86

            Errorvar.= 0.90, R² = 0.10

ColSciGd = 0.50*MSciAch - 0.084*Social - 0.22*TypeCol + 0.077*ColMin
          (0.036)        (0.028)        (0.032)        (0.030)
           14.02         -2.95          -7.00           2.54

            + 0.12*Ses, Errorvar.= 0.76, R² = 0.24
             (0.030)
              4.03

SciAmbit = 0.22*MSciAch - 0.015*Social - 0.012*TypeCol + 0.30*ColMin
          (0.032)        (0.029)        (0.031)         (0.032)
           6.80          -0.52          -0.38            9.59

            + 0.010*Ses, Errorvar.= 0.87, R² = 0.13
             (0.030)
              0.34

  Commit = 0.091*MSciAch + 0.050*Social - 0.18*TypeCol + 0.44*ColMin
          (0.028)         (0.022)        (0.024)        (0.031)
           3.27            2.21          -7.46           14.40

            + 0.21*ColSciGd + 0.53*SciAmbit - 0.20*Service + 0.013*Security
             (0.025)         (0.027)         (0.026)        (0.022)
              8.66            19.30          -7.76           0.62

            + 0.028*Ses, Errorvar.= 0.36, R² = 0.64
             (0.022)
              1.24

 Service = 0.026*MSciAch + 0.29*Social + 0.078*TypeCol + 0.28*ColMin
          (0.033)         (0.032)       (0.033)         (0.034)
           0.78            8.96          2.34            8.18

            - 0.13*Ses, Errorvar.= 0.79, R² = 0.21
             (0.032)
             -4.13
```

```
Security = - 0.045*MSciAch - 0.040*Social + 0.042*TypeCol + 0.21*ColMin
            (0.035)          (0.032)         (0.035)         (0.035)
            -1.31            -1.24           1.22            6.09

           - 0.085*Ses, Errorvar.= 0.94, R² = 0.061
            (0.033)
            -2.55

 Outcome = - 0.020*MSciAch - 0.096*Social + 0.32*TypeCol - 0.16*ColMin
            (0.027)          (0.022)         (0.027)        (0.033)
            -0.74            -4.35           12.06          -5.04

           - 0.0011*ColSciGd + 0.054*SciAmbit + 0.76*Commit - 0.094*Service
            (0.024)            (0.028)           (0.045)       (0.026)
            -0.044              1.94             16.73         -3.61

           + 0.067*Security - 0.033*Ses, Errorvar.= 0.37, R² = 0.63
            (0.021)          (0.022)
             3.17            -1.53

        CORRELATION MATRIX OF INDEPENDENT VARIABLES

                    Ses
                --------
                   1.00

        COVARIANCE MATRIX OF LATENT VARIABLES

               MSciAch     Social    TypeCol     ColMin   ColSciGd   SciAmbit
              --------   --------   --------   --------   --------   --------
  MSciAch       1.00
   Social       0.01       1.00
  TypeCol       0.31       0.13       1.00
   ColMin      -0.05       0.13       0.23       1.00
 ColSciGd       0.43      -0.08      -0.03      -0.02       1.00
 SciAmbit       0.20       0.03       0.13       0.29       0.09       1.00
   Commit       0.20       0.02      -0.01       0.48       0.30       0.65
  Service       0.03       0.32       0.16       0.34      -0.03       0.10
 Security      -0.05      -0.02       0.05       0.22      -0.03       0.06
  Outcome       0.25      -0.10       0.25       0.26       0.22       0.53
      Ses       0.06       0.14       0.24      -0.08       0.08      -0.01

        COVARIANCE MATRIX OF LATENT VARIABLES

                Commit    Service   Security    Outcome        Ses
              --------   --------   --------   --------   --------
   Commit       1.00
  Service      -0.02       1.00
 Security       0.10       0.07       1.00
  Outcome       0.71      -0.13       0.13       1.00
      Ses      -0.01      -0.10      -0.10       0.04       1.00

                        GOODNESS OF FIT STATISTICS

          CHI-SQUARE WITH 388 DEGREES OF FREEDOM = 3211.29 (P = 0.0)
              ESTIMATED NON-CENTRALITY PARAMETER (NCP) = 2823.29

                        MINIMUM FIT FUNCTION VALUE = 2.22
              POPULATION DISCREPANCY FUNCTION VALUE (F0) = 1.95
           ROOT MEAN SQUARE ERROR OF APPROXIMATION (RMSEA) = 0.071
             P-VALUE FOR TEST OF CLOSE FIT (RMSEA < 0.05) = 1.00
```

```
               EXPECTED CROSS-VALIDATION INDEX (ECVI) = 2.37
                       ECVI FOR SATURATED MODEL = 0.68
                     ECVI FOR INDEPENDENCE MODEL = 15.26

CHI-SQUARE FOR INDEPENDENCE MODEL WITH 465 DEGREES OF FREEDOM = 22046.01
                         INDEPENDENCE AIC = 22108.01
                              MODEL AIC = 3427.29
                             SATURATED AIC = 992.00
                         INDEPENDENCE CAIC = 22302.67
                              MODEL CAIC = 4105.45
                           SATURATED CAIC = 4106.54

                  ROOT MEAN SQUARE RESIDUAL (RMR) = 0.070
                           STANDARDIZED RMR = 0.070
                      GOODNESS OF FIT INDEX (GFI) = 0.88
                ADJUSTED GOODNESS OF FIT INDEX (AGFI) = 0.85
               PARSIMONY GOODNESS OF FIT INDEX (PGFI) = 0.69

                        NORMED FIT INDEX (NFI) = 0.85
                      NON-NORMED FIT INDEX (NNFI) = 0.84
                  PARSIMONY NORMED FIT INDEX (PNFI) = 0.71
                      COMPARATIVE FIT INDEX (CFI) = 0.87
                      INCREMENTAL FIT INDEX (IFI) = 0.87
                       RELATIVE FIT INDEX (RFI) = 0.83

                           CRITICAL N (CN) = 206.64
```

APPENDIX E

LISREL Solution for Female Sample

Appendix E

LISREL Solution for Female Sample (N = 900)

```
Number of Iterations = 76

LISREL ESTIMATES (MAXIMUM LIKELIHOOD)

    SATM = 0.28*MSciAch, Errorvar.= 0.92  , R² = 0.080
          (0.038)                 (0.046)
           7.45                    20.11

 MATHGRD = 0.66*MSciAch, Errorvar.= 0.56  , R² = 0.44
          (0.035)                 (0.036)
           18.98                   15.63

  BIOGRD = 0.62*MSciAch, Errorvar.= 0.62  , R² = 0.38
          (0.035)                 (0.037)
           17.51                   16.81

 PHYSGRD = 0.80*MSciAch, Errorvar.= 0.36  , R² = 0.64
          (0.034)                 (0.036)
           23.16                   10.22

COMMSERV = 0.30*Social, Errorvar.= 0.91  , R² = 0.091
          (0.035)                (0.045)
           8.64                   20.41

   CLUBS = 0.48*Social, Errorvar.= 0.77  , R² = 0.23
          (0.034)                (0.039)
           14.11                  19.79

STUDGOVT = 0.38*Social, Errorvar.= 0.86  , R² = 0.14
          (0.035)                (0.042)
           10.97                  20.23

OTHRABIL = 0.58*Social, Errorvar.= 0.67  , R² = 0.33
          (0.034)                (0.035)
           17.17                  18.90

LEADABIL = 0.96*Social, Errorvar.= 0.077 , R² = 0.92
          (0.032)                (0.036)
           30.43                  2.13

SPEAKABL = 0.63*Social, Errorvar.= 0.61  , R² = 0.39
          (0.033)                (0.034)
           18.84                  18.08

 COLTYPE = 0.97*TypeCol, Errorvar.= 0.050, R² = 0.95
          (0.026)
           37.15

  MSEGPA = 0.95*ColSciGd, Errorvar.= 0.10, R² = 0.90
          (0.028)
           33.51

    Q19H = 0.79*ColMin, Errorvar.= 0.37  , R² = 0.63
          (0.032)                (0.028)
           25.02                  13.39

    Q19L = 0.80*ColMin, Errorvar.= 0.36  , R² = 0.64
          (0.032)                (0.028)
           25.45                  12.87
```

```
     Q19Q = 0.71*ColMin, Errorvar.= 0.50  , R² = 0.50
           (0.033)                (0.030)
            21.75                  16.39

     Q19R = 0.92*Commit, Errorvar.= 0.19  , R² = 0.82
           (0.036)                (0.013)
            25.47                  14.62

     Q19S = 0.99*Commit, Errorvar.= 0.066 , R² = 0.94
           (0.038)                (0.011)
            25.85                  6.04

     Q21B = 0.83*FamValu, Errorvar.= 0.32  , R² = 0.68
           (0.035)                 (0.038)
            23.57                   8.26

     Q21F = 0.62*Service, Errorvar.= 0.62  , R² = 0.38
           (0.036)                 (0.037)
            17.07                   16.73

     Q21G = 0.49*FamValu, Errorvar.= 0.76  , R² = 0.24
           (0.035)                 (0.039)
            14.07                   19.45

     Q21J = 0.73*Service, Errorvar.= 0.46  , R² = 0.54
           (0.036)                 (0.035)
            20.46                   13.25

     Q21K = 0.88*FamValu, Errorvar.= 0.22  , R² = 0.78
           (0.035)                 (0.042)
            25.02                   5.31

     Q21M = 0.92*SciAmbit, Errorvar.= 0.15  , R² = 0.85
           (0.027)                  (0.011)
            33.68                    13.37

     Q21N = 0.91*SciAmbit, Errorvar.= 0.16  , R² = 0.84
           (0.028)                  (0.011)
            33.18                    14.23

     Q21P = 0.55*Service, Errorvar.= 0.70  , R² = 0.30
           (0.037)                 (0.039)
            14.91                   17.95

     Q21Q = 0.92*SciAmbit, Errorvar.= 0.15  , R² = 0.85
           (0.027)                  (0.011)
            33.55                    13.61

     Q21R = 0.70*Service, Errorvar.= 0.51  , R² = 0.49
           (0.036)                 (0.035)
            19.52                   14.49

    MSE90 = 0.98*Outcome, Errorvar.= 0.050, R² = 0.95
           (0.031)
            32.23


 FATHEDUC = 0.93*Ses, Errorvar.= 0.14  , R² = 0.86
           (0.036)            (0.047)
            25.74              2.86

 MOTHEDUC = 0.68*Ses, Errorvar.= 0.54  , R² = 0.46
           (0.035)            (0.036)
           19.13               14.89

  INCOME = 0.55*Ses, Errorvar.= 0.70  , R² = 0.30
          (0.035)             (0.038)
           15.65               18.37

Error Covariance for STUDGOVT and CLUBS = 0.48
                                         (0.033)
                                          14.32

 MSciAch = 0.050*Ses, Errorvar.= 1.00, R² = 0.0025
          (0.042)
           1.21

  Social = 0.15*Ses, Errorvar.= 0.98, R² = 0.021
          (0.038)
           3.84

 TypeCol = 0.34*MSciAch + 0.036*Social + 0.17*Ses, Errorvar.= 0.85, R² = 0.15
          (0.041)        (0.035)        (0.037)
           8.30           1.02           4.51

  ColMin = 0.0029*MSciAch + 0.098*Social + 0.15*TypeCol - 0.13*Ses,
          (0.046)          (0.040)        (0.043)        (0.041)
           0.062            2.49           3.43          -3.03

            Errorvar.= 0.96, R² = 0.039

SciAmbit = 0.13*MSciAch + 0.039*Social - 0.12*TypeCol + 0.36*ColMin
          (0.041)        (0.035)        (0.039)        (0.040)
           3.21           1.10          -3.07           9.01

            - 0.059*Ses, Errorvar.= 0.84, R² = 0.16
             (0.037)
             -1.58

ColSciGd = 0.45*MSciAch - 0.029*Social - 0.27*TypeCol + 0.14*ColMin
          (0.047)        (0.036)        (0.041)        (0.039)
           9.50          -0.80          -6.62           3.50

            + 0.080*Ses, Errorvar.= 0.80, R² = 0.20
             (0.038)
              2.11

 Service = 0.053*MSciAch + 0.20*Social + 0.11*TypeCol + 0.27*ColMin
          (0.046)         (0.040)       (0.043)        (0.044)
           1.15            4.82          2.54           6.16

            - 0.075*Ses, Errorvar.= 0.85, R² = 0.15
             (0.042)
             -1.80

 FamValu = 0.0021*MSciAch + 0.069*Social - 0.10*TypeCol + 0.078*ColMin
          (0.045)          (0.039)        (0.043)        (0.042)
           0.046            1.77          -2.37           1.88

            + 0.057*Ses, Errorvar.= 0.98, R² = 0.020
             (0.041)
              1.40

  Commit = 0.14*MSciAch - 0.0067*Social - 0.052*TypeCol + 0.39*ColMin
          (0.033)        (0.024)         (0.028)         (0.036)
           4.39          -0.28           -1.90           10.99
          + 0.62*SciAmbit + 0.042*ColSciGd - 0.21*Service + 0.073*FamValu
           (0.038)          (0.027)          (0.030)         (0.024)
           16.28            1.55             -6.92           3.04

          + 0.088*Ses, Errorvar.= 0.27, R² = 0.73
           (0.025)
           3.51

Outcome = - 0.077*MSciAch - 0.010*Social + 0.091*TypeCol - 0.069*ColMin
           (0.036)          (0.026)         (0.030)         (0.042)
           -2.14            -0.39           3.03            -1.66

          - 0.064*SciAmbit + 0.15*ColSciGd - 0.024*Service - 0.038*FamValu
           (0.045)           (0.030)         (0.034)          (0.026)
           -1.42             5.16            -0.70            -1.45

          + 0.85*Commit - 0.017*Ses, Errorvar.= 0.37, R² = 0.63
           (0.069)        (0.027)
           12.31          -0.62


       CORRELATION MATRIX OF INDEPENDENT VARIABLES

               Ses
          --------
              1.00


       COVARIANCE MATRIX OF LATENT VARIABLES

            MSciAch     Social    TypeCol     ColMin   SciAmbit   ColSciGd
           --------   --------   --------   --------   --------   --------
 MSciAch       1.00
  Social       0.01       1.00
 TypeCol       0.35       0.06       1.00
  ColMin       0.05       0.09       0.13       1.00
SciAmbit       0.11       0.06      -0.03       0.36       1.00
ColSciGd       0.36      -0.02      -0.09       0.11       0.10       1.00
 Service       0.10       0.22       0.16       0.31       0.12       0.03
 FamValu      -0.03       0.08      -0.07       0.07       0.03       0.02
  Commit       0.21       0.03       0.00       0.55       0.75       0.20
 Outcome       0.17       0.00       0.04       0.39       0.55       0.27
     Ses       0.05       0.15       0.19      -0.08      -0.10       0.04

       COVARIANCE MATRIX OF LATENT VARIABLES

            Service    FamValu     Commit    Outcome        Ses
           --------   --------   --------   --------   --------
 Service       1.00
 FamValu       0.02       1.00
  Commit      -0.01       0.12       1.00
 Outcome      -0.05       0.05       0.77       1.00
     Ses      -0.05       0.04       0.00       0.02       1.00


                         GOODNESS OF FIT STATISTICS

          CHI-SQUARE WITH 388 DEGREES OF FREEDOM = 2290.09 (P = 0.0)
            ESTIMATED NON-CENTRALITY PARAMETER (NCP) = 1902.09

                     MINIMUM FIT FUNCTION VALUE = 2.70
             POPULATION DISCREPANCY FUNCTION VALUE (F0) = 2.24
          ROOT MEAN SQUARE ERROR OF APPROXIMATION (RMSEA) = 0.076
          P-VALUE FOR TEST OF CLOSE FIT (RMSEA < 0.05) = 0.0000092
```

```
                EXPECTED CROSS-VALIDATION INDEX (ECVI) = 2.95
                       ECVI FOR SATURATED MODEL = 1.17
                     ECVI FOR INDEPENDENCE MODEL = 15.43

 CHI-SQUARE FOR INDEPENDENCE MODEL WITH 465 DEGREES OF FREEDOM = 13037.59
                        INDEPENDENCE AIC = 13099.59
                            MODEL AIC = 2506.09
                           SATURATED AIC = 992.00
                        INDEPENDENCE CAIC = 13277.69
                            MODEL CAIC = 3126.58
                          SATURATED CAIC = 3841.64

                   ROOT MEAN SQUARE RESIDUAL (RMR) = 0.071
                          STANDARDIZED RMR = 0.070
                      GOODNESS OF FIT INDEX (GFI) = 0.87
                 ADJUSTED GOODNESS OF FIT INDEX (AGFI) = 0.83
                PARSIMONY GOODNESS OF FIT INDEX (PGFI) = 0.68

                        NORMED FIT INDEX (NFI) = 0.82
                      NON-NORMED FIT INDEX (NNFI) = 0.82
                   PARSIMONY NORMED FIT INDEX (PNFI) = 0.69
                      COMPARATIVE FIT INDEX (CFI) = 0.85
                      INCREMENTAL FIT INDEX (IFI) = 0.85
                       RELATIVE FIT INDEX (RFI) = 0.79

                          CRITICAL N (CN) = 169.95
```